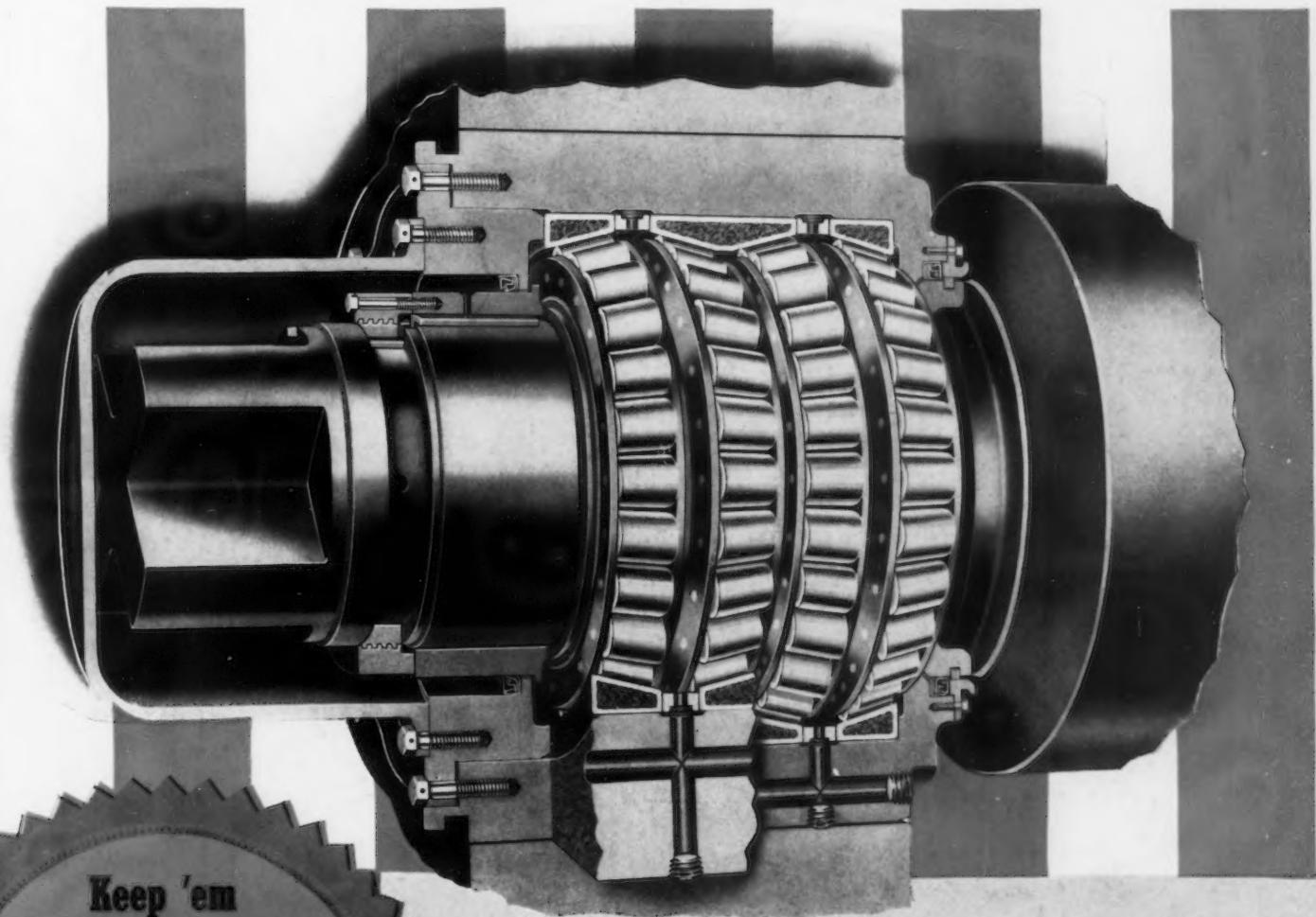


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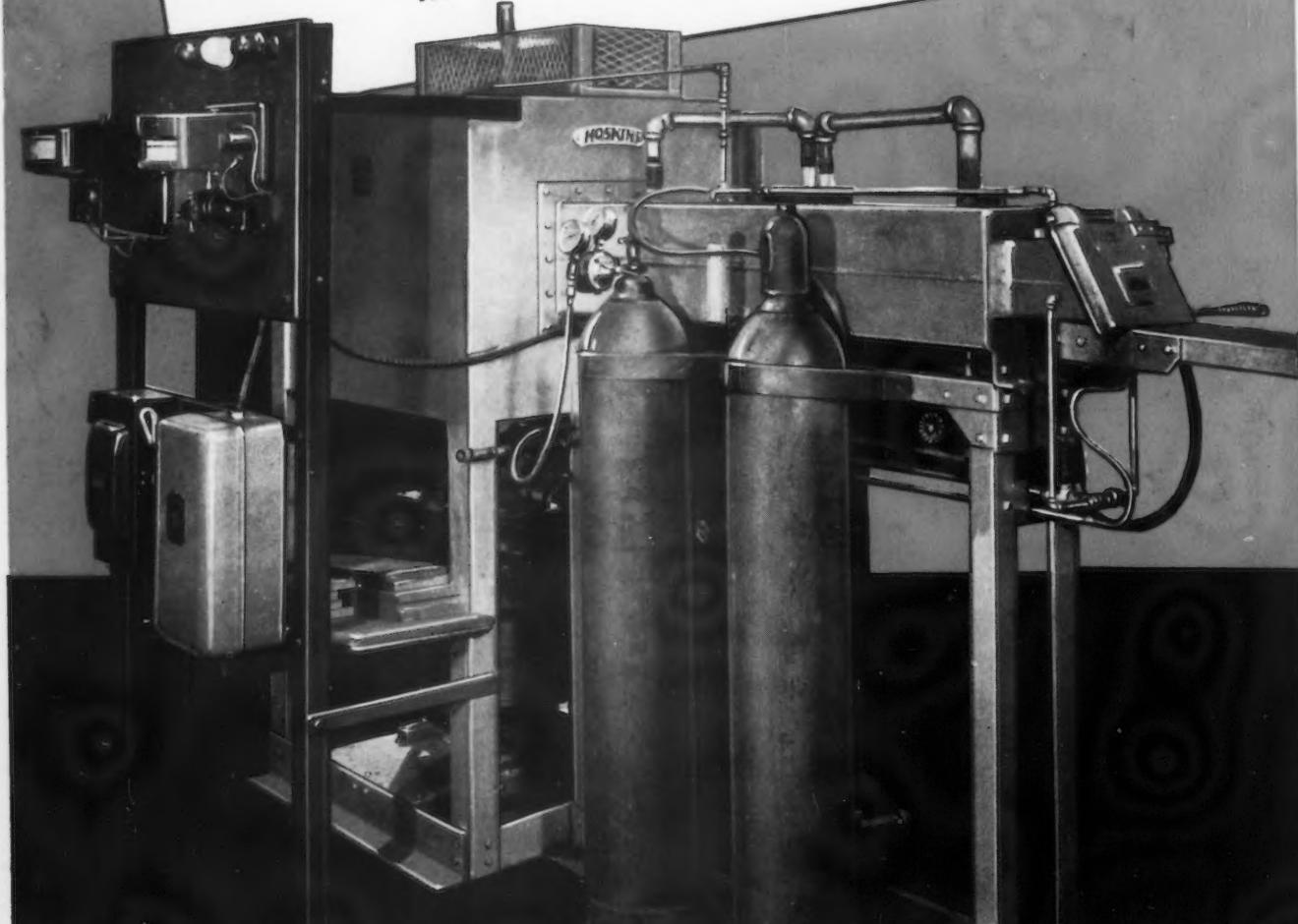
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THE IRON AGE

JULY 16, 1942

ESTABLISHED 1855



Hold That Tiger!

ONCE upon a time there was a Bengal tiger, a most ferocious beast, who escaped from his cage because his keeper had left the door unlocked. The zoological garden was crowded with visitors and a great cry arose from the masses of people who were in mortal fear of being killed or terribly mutilated by the sharp claws and slavering jaws of the beast.

Fortunately, the head keeper and a number of his assistants were at hand and bravely seized the beast by the tail after it had inflicted serious injuries upon several of the thousands of persons present. After a heroic struggle, the tiger was finally put back into his cage.

Newspaper headlines, next day, called the intrepid keepers heroes and public benefactors who had prevented injury to many people. And Congress voted them medals.

If any bystanders had suggested to the keepers that they let go of the tiger's tail and permit him to run at large, I think they would have been promptly mobbed by a justly irate public.

There is a tiger breaking loose in our land today; a tiger a million times more dangerous than any Bengal tiger could be. If he succeeds in getting away from the men who have a precarious hold on his tail, he will injure every man, woman and child in America and all of our Allies as well. He is the inflation tiger. No one can escape him, once he is loose, except the speculator, and his specialty is putting the bite on widows, orphans and old folks who live on savings and the small fry among the wage earners.

Leon Henderson has been doing a grand job, with his associates, holding that tiger by the tail. Everybody ought to help him with moral support even though not all of us can lend a hand. But unfortunately, there are people putting pressure upon him to let the tail slip.

The farm bloc in Congress, for example, wants him to let a couple of inches of tail for the benefit of its constituents. The Steel Workers representatives want him to let out some more inches in favor of their members. Of course, nobody wants him to let go altogether, but just enough so the tiger can bite some other fellow.

The trouble is that even a price tiger has a limited amount of tail and when you let a little bit out at a time, you finally get to the end of it. And then the fun begins—for the tiger.

So the best thing to do is to grab tight just as close to the tiger as you can and then hang on like grim death. And I think that all of us ought to encourage Leon Henderson to do just that. To hold that tiger!

J. V. Van Doren

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Scrap Shortage Cuts Steel Rate

Operations for Week
Scheduled at 98 Pct.

Shortage of iron and steel scrap brought scheduled steel operations for this week to 98 per cent of rated capacity, a new low since April 25, the American Iron & Steel Institute's weekly report showed yesterday.

The week's operating rate, which represents output of 1,664,600 net tons of steel ingots, is only 0.3 point under the previous week's 98.3 per cent, representing an output of 1,669,700 net tons.

Steel operations have been declining since the record weekly output on a tonnage basis was set one month ago today. At that time the operating rate was 99.6 per cent of capacity, representing production of 1,691,800 net tons.

Three weeks ago the rate was 99.3 per cent and the next week it was the same.

A year ago steel operations were at 99.9 per cent, but that was based on a smaller capacity. It ac-

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Soaking Pit and Reheating

Furnace

Refractories

IN the days when soaking pits were literally pits in which ingots taken from the molds were allowed to "soak" to an even heat, no external heating being employed, and reheating furnaces were little more than firebrick boxes, a "good" fireclay brick met all needs. But today Litinsky's assertion that "there is no such thing as a good brick," a brick being only good in relation to some specific job, is very much to the point.

This is well illustrated by the triple fired, two zone, continuous slab reheating furnaces which represent a peak in reheating furnace design and which demand a whole range of refractories for efficient operation. One section of the roof must be built of super-duty fireclay brick, whereas another zone, which operates at a lower temperature, can be constructed of high heat duty brick. The hearth is exposed not only to a high temperature but also to attack by scale and is made from a chrome plastic rammed on fireclay brick, which in turn rests on insulating concrete. The use of even the best roof brick in the hearth would soon put the furnace out of commission due to excessive slagging while an attempt to use second instead of first

...Continuing the series of articles[†] on steel plant refractories, the author discusses in Part I of a two-part account the materials required in soaking pits, as well as for the continuous slab reheating furnace and the walking beam furnace used for heating spring plates.

quality brick in the roof would lead to spalling. In spite of these special requirements the refractories costs on these furnaces are said to be as low as 2 c. per ton of slabs heated. This achievement depends in great measure on the high through-put which sometimes exceeds 600 tons per furnace per day.

Many different types are included in the heading: "Soaking Pits and Reheating Furnaces," and even the subdivision into these two main groups is far from sharp. Thus, a continuous bogie type furnace built on the principle of the ceramic tunnel kiln, but operating under far more severe conditions can be used for soaking ingots or for reheating material prior to forging. Reheating furnaces working at high temperatures, 2372 deg. F. and over, are subject to the same refractory difficulties as soaking pits, and hence in this article, the brick used for both types will be discussed under each sub-heading. The ordinary soaking pit has no roof as such, the top being covered with a lid or series of lids either with or without arches between. Even this characteristic does not differentiate between soaking pits and reheating furnaces

By J. H. CHESTERS
*Central Research Department,
United Steel Companies, Ltd.,
Stocksbridge, England*

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since the latter can also be top-charged.

Although from the refractory standpoint there is, therefore, no sharp division between the two groups, such a division can be made as regards their use. Whenever possible the hot ingots are taken to the soaking pits, Fig. 1, shortly after stripping, thus conserving the heat in the steel and minimizing strain due to heating and cooling. In most plants, however, a proportion of the ingots are allowed to cool and are heated up again in soaking pits.

Reheating furnaces, on the other hand, receive the product obtained when the ingot has been rolled, Figs. 2 and 3. This may be in the form of billets, slabs, sheets, or sheet bar. Where considerable hot work, such as forging has still to be done, as in Fig. 4, the material is heated to a temperature comparable with that used for the initial rolling; but for many purposes the temperature is much lower and the demands on the refractories correspondingly less severe.

The fuels used in reheating furnaces and soaking pits vary with the type of work and the local economy, but the cleanliness of operating with gas or oil and the

[†]Previous articles by J. H. Chesters, on steel plant refractories that have appeared in THE IRON AGE are:

"All Basic Open Hearth Furnaces," Aug. 15 and 22, 1940.

"Steel Plant Refractories," Feb. 6 and 13, 1941.

"Basic Open Hearth Above Sill Plate Level," May 22 and 29, 1941.

"Basic Open Hearth," Aug. 7, 14, and 21, 1941.

"Electric Steel Plant Refractories," March 5 and 12, 1942.

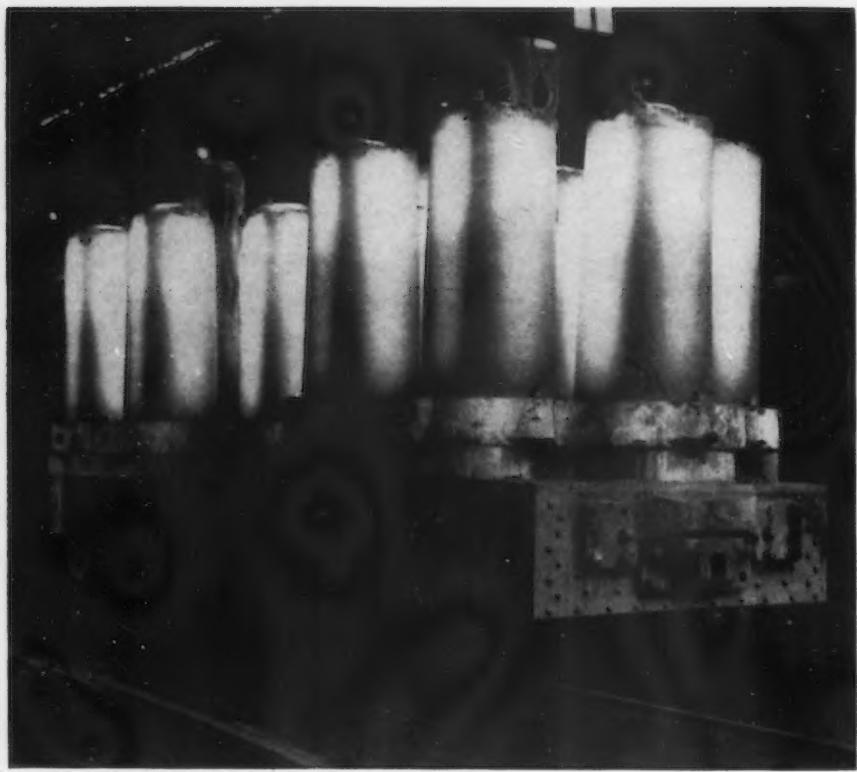


Fig. 1—Stripped ingots on their way to the soaking pits.

greater ease of temperature control have led to the replacement of a considerable proportion of the coal-fired furnaces. For very special purposes, such as bright annealing, electrically heated furnaces are employed.

Soaking Pits

Gillies and Martin have sug-

gested that soaking pits can be divided into four principal types, as follows:

(1) *The Reversing Regenerative Pit.* In this furnace combustion takes place in the ingot heating chamber itself. Regenerating chambers containing the checkers are located at each end. On one cycle the waste gas is passed

through one of the regenerator chambers to heat the checkers, while the other chamber is pre-heating combustibles as they pass through; on the next cycle the functions of the two chambers are reversed. The most modern furnaces of this type are equipped with sealing covers, on the movement of which the draught and fuel shut-off are automatically controlled.

(2) *The One-way Fired Recuperative Pit.* In the development of this type of pit, the aim was to eliminate two of the serious drawbacks of the type of pit just discussed: Irregularity of heating, with consequent temperature differences destructive to the furnace heating chamber and checker chambers, and the difficulty of local temperature control due to the use of the heating space as a combustion space with consequent direct flame impingement on the ingots. The first drawback of the older type of pit was met by using recuperators for preheating the air, and the second drawback was largely overcome by firing high in a deep heating chamber where the ingot tops were out of the path of combustion. The waste gases were exhausted on the same side from which the pit was fired at a point near the bottom.

(3) *The Bottom Fired Recuperative Pit.* One of the most recent developments in ingot heating furnaces is the rectangular pit fired from a central point in the bottom by one burner and exhausting the waste gases through four exit ports in the lower parts of the walls. The ingots are placed in the area surrounding the burner opening in the center and far enough back to allow a fair sized space as a combustion chamber. There the rising combustibles strike the cover and are turned back along the walls into the area where the ingots stand. The exhaust gases pass through four tile recuperators of an advanced design in a vertical downward direction, while the incoming air is passed horizontally and upwards in successive passes around the vertical tubes. Unusually high preheat temperatures may be obtained with this recuperator.

(4) *The Tangentially Fired Circular Pit.* The last type of ingot heating furnace that merits description is the so-called tangentially fired circular pit, Fig. 15. It consists of a circular furnace completely encased in steel—as are the

Fig. 2—Ingots for the soaking pit after passage through a billet mill.



modern rectangular pits also—and fired tangentially at even intervals around the circumference in a plane near the base of the ingots.

The burners are placed at an angle of $37\frac{1}{2}$ deg. from the radii and fired into an inner refractory bridge wall which prevents direct flame impingement on the ingots. Here the multiple and small burners insure against the localized high temperatures often resulting from the use of a small number of burners. The ingots are placed about a central exit port, sufficient in size to exhaust the waste gases properly. The circular wall is tapered back to increase the inside diameter at the point of firing.

Reheating Furnaces

Reheating furnaces vary even more widely in design. They may be of the simple in-out type or the single or double chamber continuous billet heating furnace type. In addition, there are endless specialized types, such as the walking beam furnace used for heating spring leaves, shown in Fig. 6, or the tower furnace, used for bright annealing, shown in Fig. 7.

In spite of the great divergences of type, both soaking pits and reheating furnaces can be subdivided, as follows: (1) Roof, which may be a lid or lids, (2) side walls, with which are included burner blocks and fireboxes, (3) hearths, (4) flues, including slag pockets, if any, and (5) recuperators or regenerators.

With small gas fired furnaces, the exit gases often exhaust to atmosphere through the doors and other openings, in which case there are no flues and no recuperators or regenerators.

Table I gives the refractories layout for three furnaces, namely, a coal fired soaking pit, a continuous slab reheating furnace of the type used in preheating material for car body sheets, and a walking beam furnace used for heating spring plates. The refractories used will be discussed in more detail under the sub-divisions of: Roof, side walls, etc., but it is of interest to note that even with the rather primitive coal fired soaking pit a considerable range of refractories is required.

The bricks used in the various positions have mostly been arrived at by a process of trial and error, for example, siliceous fireclay brick in a roof may have given trouble and been replaced by a more aluminous grade. With furnaces like

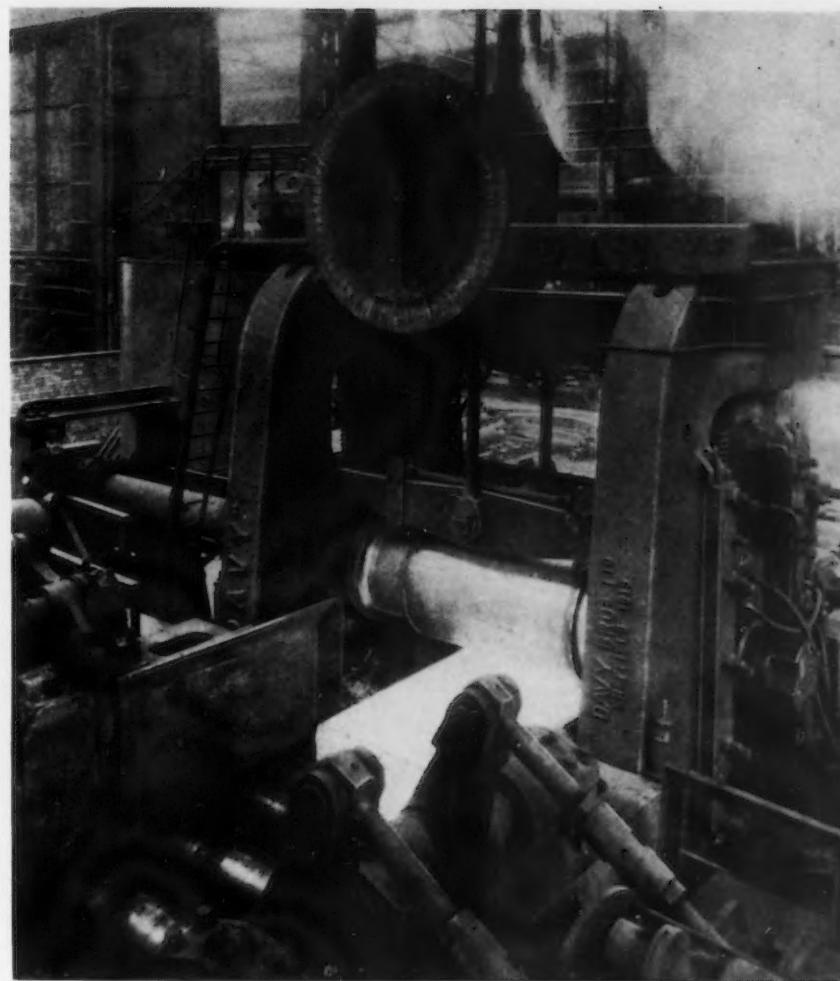


Fig. 3—Electrically driven slab mill.

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Fig. 4—Withdrawing a collared forging from a reheating furnace.



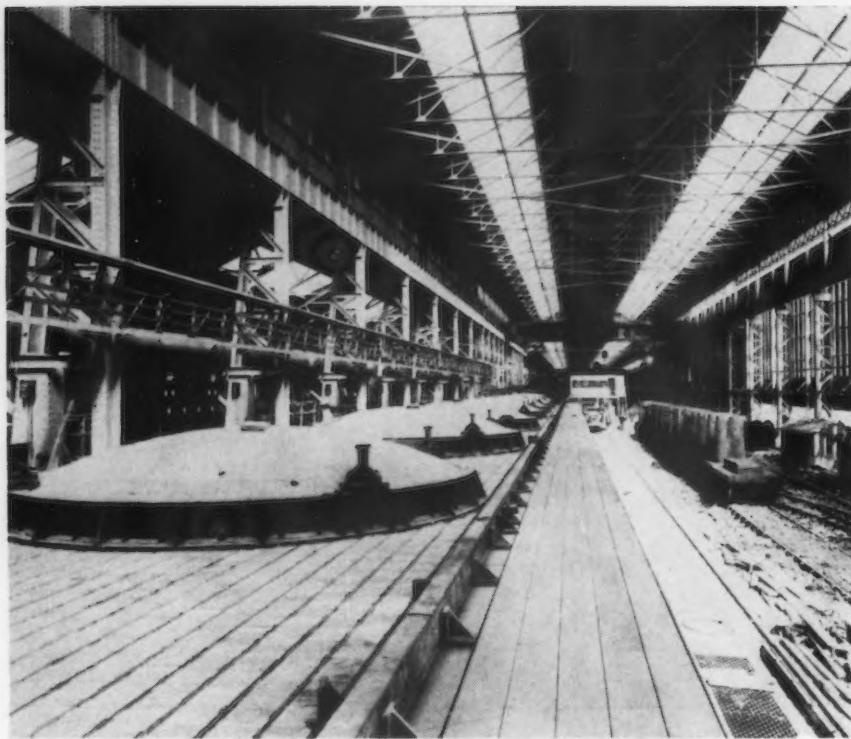


Fig. 5—Circular type soaking pit. (Courtesy of Salem Engineering Co., Ltd.)

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TABLE I
Selected Arrangements of Refractories in Reheating Furnaces
and Soaking Pits

Section	Soaking Pit, Coal Fired, Waste Heat Boiler	Continuous Slab Reheating Furnace	Walking Beam Spring Heating Furnace
Roof	Arches: Low alumina fireclay, such as F. 17 in table III	Low temperature zone: Medium alumina fireclay, such as F. 2 High temperature zone: high alumina, 42 per cent, fireclay, such as F. 8 or F. 40	Medium alumina fireclay and low temperature insulation
Side Walls	Top: Low alumina fireclay, such as F. 3 backed backed with F. 4 Slag line: Magnesite, chrome, chrome- magnesite, or chrome-silica, such as X.1 or X.2 Firebox: Medium and low alumina fireclay bricks, such as F.2, F.5, and F.3	Medium alumina fireclay, such as F. 2 backed with low temperature insulation 	Medium alumina fireclay backed with low temperature insulation
Doors	See "Roof"	Entry: Insulating concrete Exit: Medium alumina fireclay, such as F.2	Medium alumina fireclay with asbestos backing
Hearth	Low alumina fireclay, such as F.3	Chrome plastic on medium alumina fireclay, such as F.2	Sillimanite, such as X.14 and medium alumina fireclay, such as F.2
Flues	Low alumina fireclay, such as F.3 backed with F.4	Medium alumina fireclay, such as F.2	.....

continuous slab reheating furnaces, where the whole production of a mill may depend on the output of one unit, the use of the more durable super-duty fireclay brick is considered worth while. In side walls, fireclay bricks are normally employed but basic refractories are desirable at the slag line in soaking pits to avoid undercutting of the wall. The doors may be fireclay brick, but if the temperature and atmosphere permit, insulation either in brick or cement form can be used to give a lighter door, fuel economy, and more even heating of the charge. The choice of a hearth brick likewise depends on the precise conditions. At 1832 to 2012 deg. F. no serious attack by mill scale occurs, but at higher temperatures basic hearths may be required if contamination of the product by molten scale and frequent shut-downs are to be avoided.

Roof

Construction:

Both soaking pits and reheating furnaces are fitted with a great variety of roofs. With the soaking pit, most of the roof consists of a lid or a series of lids which can be lifted with a crane or made to slide on a track. Where lids are employed, there is usually some sort of sand seal to insure a more or less gas tight fit. This is important both from the standpoint of fuel economy and refractories, since a poorly fitting lid leads to rapid destruction of the brick at the point where the flame escapes.

The sand used should not sinter too readily since otherwise it will not perform its true function. In both soaking pits and reheating furnaces, the roof or lid may be sprung from skewbacks or suspended by steel hangers. Particularly with reheating furnaces, the suspended type offers many advantages; in particular the possibility of using a complex roof shape and yet maintaining stability. The Detrick type of roof, shown in Fig. 8, used on the continuous slab reheating furnaces, offers a good example of this type of construction. The individual bricks can be made with side corrugations, for example, the Detred tile, which prevent cracked bricks from falling away and render the furnace more gas tight. The use of this type of roof enables the contours of the furnace to be adjusted to meet the fuel engineers' conception of the most efficient combustion space.

At first sight it would appear

that roofs built in this way, using many special shapes, would result in a high overall cost; but the fact that such slab furnaces operate with a total refractories cost of only about two cents a ton as compared with say \$1.00 per ton for an open hearth furnace shows that the roof costs cannot be high. Where sprung arches are used, similar considerations apply to those already discussed in connection with basic open hearth furnaces.

The general design problem has been ably discussed by Spotts, McDowell, and Gill in their article on "Refractory Arches." They suggest that a fireclay roof or arch should have a rise of at least $1\frac{1}{2}$ in. and not more than 3 in. per ft. of span, the higher figure being recommended for roofs subject to unusually high temperatures or to a soaking heat, such as those heated both from above and below. The gas port arch in certain types of soaking pits are examples of such. The rise is somewhat greater than that usually recommended for silica bricks and this is not surprising since the latter withstand a very much greater temperature under load than the average fireclay brick.

Where high temperature insulating brick are used in roof construction, a rise of not less than 2 in. per ft. is recommended. The thickness of the arch is a function of the span and it is suggested that it should not be less than $4\frac{1}{2}$ in. for spans of up to 5 ft.; 9 in. for spans between 5 and 12 ft.; and 12 or $13\frac{1}{2}$ in. for spans of over 12 ft. Arches that are relatively flat, insulated, or subjected to extremely high temperatures or to severe corrosion, should be thicker. These authors also point out that where conditions are particularly severe, for example when spanning an opening through a wall, it is advantageous to use two or more sprung arches, one above the other, the lower arch serving to withstand the brunt of the severe furnace conditions while the upper or relieving arches support the weight of the wall and facilitate repairs and renewals to the lower arch.

Materials:

The properties of a number of reheating furnace and soaking pit roof brick are given in Table II. In general, soaking pit lids are lined with medium alumina fireclay brick of type similar to that given under the code No. F. 2.



Fig. 6—Walking beam type furnace used for heating spring plates.

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TABLE II
Properties of Reheating Furnace Roof Bricks

Code No.	Special Firebrick (Suspended Roof) Aluminous Fireclay		Normal Firebrick Medium Alumina Fireclay
	F. 40	F. 8	F. 2
Apparent porosity,* per cent	26.7	31.5	21.7
Bulk density gm. per c. c. lb. per cu. ft.	1.96 122	1.82 114	1.98 124
Apparent specific gravity	2.67	2.65	2.53
Crushing strength, on end, lb. per sq. in.	790	n.d.	4140
Permeability to air c.g.s. units, perpendicular 9x3 in. face, 1 skin	0.46	0.03	0.013
After contraction, 2 hr. at 2570 deg. F.	0.0	1.3 (contraction)	0.6 (contraction)
Pyrometric cone equivalent (Seger)	33/34 (3164 deg. F.)	n.d.	30/31 (3056 deg. F.)
Refractoriness under load Rising temperature, 50 lb. per sq. in.			
Initial softening:	2228 deg. F.	2318 deg. F.	2228 deg. F.
Rapid softening:	2354 deg. F.	2552 deg. F.	2642 deg. F.
Fail Temperature:	2786 deg. F.	2696 deg. F.	2804 deg. F.
Thermal shock resistance	30+	30+	30+
Thermal expansion 248 to 1832 deg. F. per cent	0.55	0.41	...

*The methods of test were described in THE IRON AGE, Feb. 6 and 13, 1941.

It will be seen that this brick has a fairly high bulk density, good crushing strength, moderate permeability, and reasonable stability on reheating to 2570 deg. F. Its

ever, cheaper bricks, such as F. 17 in Table III, give quite good results. This brick is a "potty" brick of the bloating type and has only average thermal shock resistance.

ing a melting point of 3092 deg. F. or over and a considerably higher porosity, which gives internal "play" and accounts in part for their freedom from spalling. The thermal shock resistance of these brick, as tested in the laboratory, is always 30 reversals or over.

The difficulty with this type is that unless it has been particularly hard fired, say to 2642 deg. F. or over, it shows after contraction in service. This leads to open joints through which the flame can penetrate and attack the brick at the sides as well as at the end, leading to stress concentrations at the interface between the vitrified face and the cool end, and consequent spalling losses. Such shrinkage is said to be more severe with bricks whose alumina content has been artificially raised by adding bauxite to medium alumina clays.

With some furnaces it is possible to build the roof of high temperature insulation, or failing that of insulating fireclay brick of abnormally high porosity, about 50 per cent, but much less porous than the proper high temperature insulating brick, 70 per cent porosity. For annealing boilers or for the heat treatment of large blooms, furnaces built entirely of high temperature insulation, except for the firebrick hearth, have proved very useful. Their durability is considerable, there are appreciable fuel and time savings due to the low heat capacity of the brickwork. In most soaking pits and reheating furnaces, however, insulation, if used at all, is limited to a thin layer placed outside the firebrick.

Another type of brick that gives excellent service in reheating furnace roofs is the semi-silica or sand-clay brick. This glazes readily, particularly in the presence of coal ash, and tends to show an expansion rather than a contraction on re-firing. Thus, in a recently constructed bogie type ingot reheating furnace in which a patch of the roof had to be built with semi-silica brick due to a temporary shortage of the normal fireclay brick, F. 2 in Table II, the semi-silica brick were found to have glazed far better than the fireclay brick and, unlike the latter, showed no signs of open joints.

Where it is absolutely essential that the sheets or other product

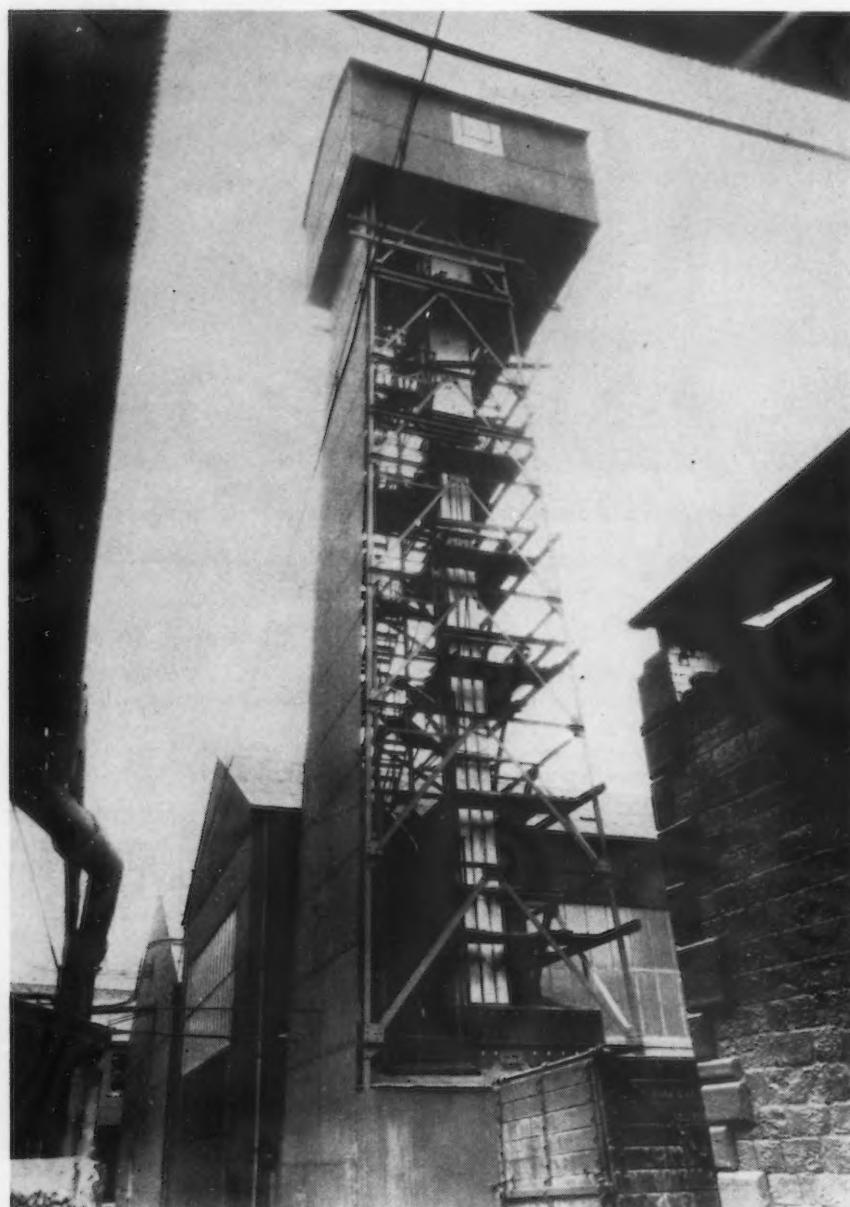


Fig. 7—A Siemens-Schukert tower furnace used for bright annealing strip.

melting point is 3056 deg. F. while it shows signs of softening even at 2228 deg. F. under a load of 50 lb. per sq. in. Its thermal shock resistance is excellent, a desirable property in view of the temperature fluctuations resulting from repeated opening and closing of soaking pit lids. This general purpose type of firebrick finds many applications in the steel-works. It can be used quite successfully in open hearth furnace doors and in ladles.

With many installations, how-

ever, it glazes readily and because of its low softening temperature the brick in the roof or lid soon become monolithic, at least at the working face.

For special purposes, such as the suspended roofs of the multi-zone slab heating furnaces, a higher grade of refractory, namely, the "super-duty," or "high-heat duty" fireclay brick used in the United States, is employed. In Great Britain, bricks of the type F. 40 and F. 8 have been found to give good service. It will be seen that these are of a more aluminous grade hav-

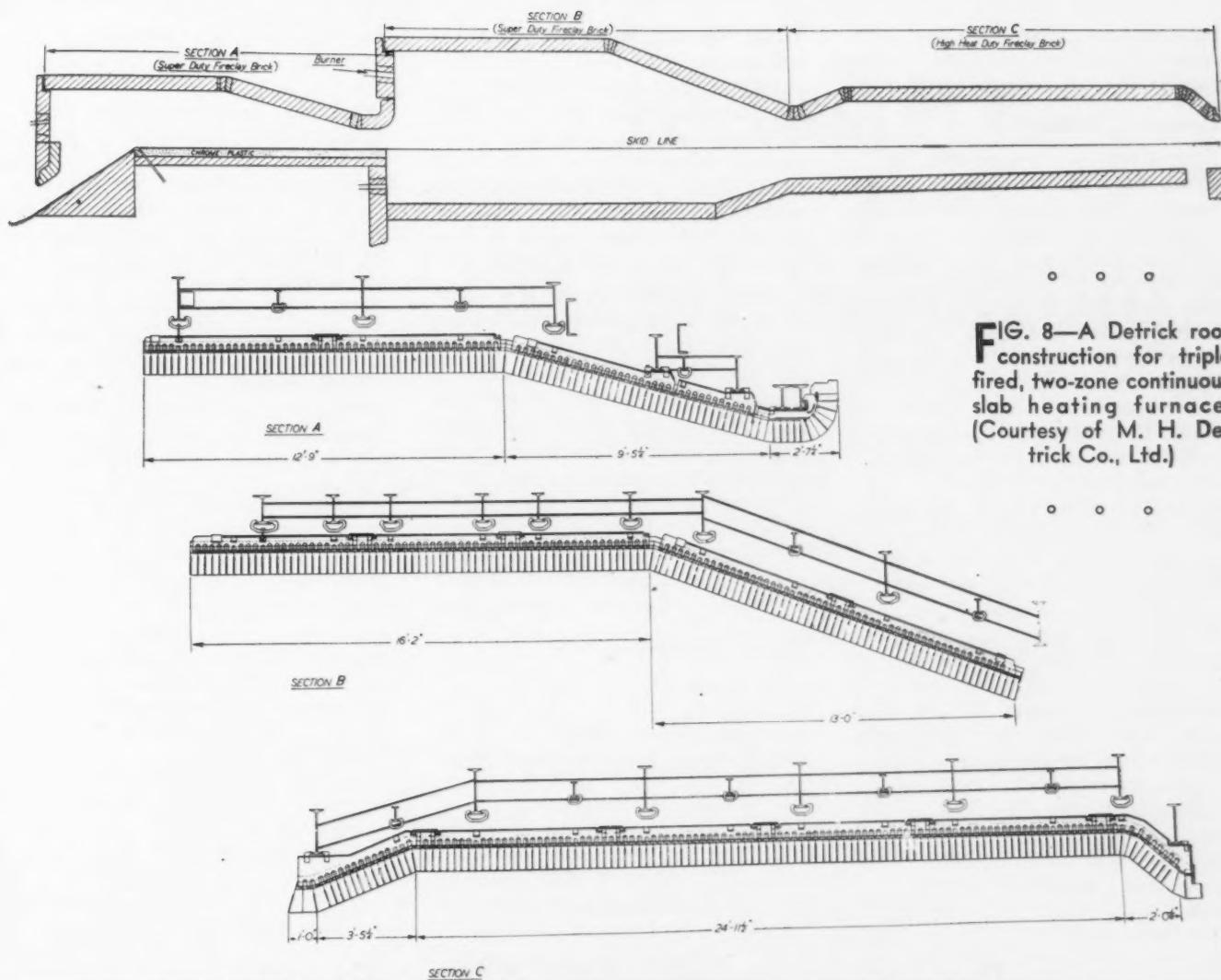


FIG. 8—A Detrick roof construction for triple fired, two-zone continuous slab heating furnace. (Courtesy of M. H. Detrick Co., Ltd.)

TABLE III
Properties of Fireclay Bricks Used In Reheating Furnace Side Walls

Code No.	F. 3	F. 4	F. 14	F. 15	F. 17	F. 18	F. 27	F. 28
Apparent porosity, per cent	20.8	20.8	26.9	34.5	23.7	23.7	18.9	22.0
Bulk Density gm. per c. c. lb. per cu. ft.	2.09 131	2.09 131	1.93 121	1.79 112	2.00 125	2.00 125	2.05 128	1.99 125
Apparent specific gravity	2.65	2.65	2.64	2.74	2.63	2.63	2.53	2.56
Crushing strength on end lb. per sq. in.	1690	4510	3130	1740	6910	3320	1890	2940
Permeability to air c.g.s. units, perpendicular 9x3 in. face, one skin	0.015	0.027	0.0033	0.0097	0.0036	0.0098	0.40	0.029
After contraction: 2 hr. at 2570 deg. F.	-4.0 (Exp)	-8.7 (Exp)	-5.1 (Exp)	3.0 (Contraction)	-3.6 (Exp)	-3.5 (Exp)	-1.1 (Exp)	-0.06 (Exp)
Pyrometric cone equivalent (Seger)	26-27 2912 deg. F.	27-28 2948 deg. F.	20-26 2840 deg. F.	28 2966 deg. F.	20-26 2822 deg. F.	20-26 2840 deg. F.	34-35 3200 deg. F.	32 3110 deg. F.
Refractoriness under load: Rising temperature, 50 lb. per sq. in.								
Initial softening, deg. F.	2264	2228	2012	2318	1850	2120	2318	2156
Rapid softening	2534	2462	2372	2444	2588	2516	2570	2498
Fail temperature	2768	2732	2642	2660	2768	2714	2912	2804
Thermal shock resistance	30+	26+	14	9	12	12	30+	30+

be kept free from brick dust, sillimanite may be employed in the roof in spite of its high initial cost.

Causes of Failure

Spalling is responsible for a great deal of the damage to reheating furnace roofs, but is only a serious problem with furnaces used intermittently. What appears to be thermal shock spalling may be due initially to after shrinkage which exposes the brick to heating from the sides as well as the ends. As already stated, the risk of such brick ends coming away can be reduced by the use of special corrugated shapes such as the "Detred," but undoubtedly the greatest hope of improvement lies in the choice of a brick having less tendency to vitrify together with insulation of the roof where this is practical.

In most reheating furnaces and soaking pits, actual slag attack on the roof is slight. An exception is the coal fired soaking pit where a considerable amount of ash may come over from the fire boxes. Much of the trouble that is experi-

enced, particularly with soaking pit lids, is the result of imperfect fitting of the bricks or of the lid on the furnace walls, allowing gases to escape and causing local overheat, erosion, and eventually spalling. This is accentuated by the scaling that occurs when the steel or cast iron frame comes in contact with the escaping gases.

Even where great care is exercised, ingots periodically fall from the dogs onto soaker lids or against the side walls and cause serious damage. The problem is accentuated where alloy steel ingots are being reheated, since their hardness at temperature makes a good grip more difficult. With forge furnaces, considerable damage can be done by vibration from adjacent hammers and by the impact of the charge on the hearth.

Lines of Improvement

It would appear that the most encouraging line for improvement lies with design. Thus far, better results have been obtained from

soaker lids where mechanical devices have been installed to enable the lid to be first lifted and then traversed laterally rather than dragged from position by a purely sideways pull. Thus, if there is projecting brickwork or adhesion between the roof and the brickwork, the ordinary withdrawal of the lid will result in tearing of the top of the side walls.

The recent development of the super-duty brick has reached a more advanced stage in the United States, due to the availability of the Missouri diaspore deposits which provides a brick that will stand up to extremely severe conditions without undue vitrification. Further development along these lines will do much to reduce the trouble at present experienced by spalling and slag attack.

Editors Note: Next week the author concludes this investigation with a discussion of the refractories used in soaking pit and reheating furnace side walls, hearths, and flues.

Ryerson Stocks NE Alloy Steels

THE addition of NE (National Emergency) alloys steels to the warehouse stocks of Joseph T. Ryerson & Son, Inc., has been announced. NE alloys, the new "lean" alloy steels established by the WPB to help conserve nickel, chromium, vanadium, and other scarce alloys, will be carried by Ryerson in six different analyses of hot rolled rounds in sizes ranging from $\frac{1}{2}$ to 7 in. in diameter. While, heretofore, these steels have not been available for experimentation, manufacturers may now obtain small lots for treating and testing in specific applications.

The six analyses that will be carried in stock are: (1) Carburizing alloys, NE 4023 and NE 8620; (2) medium hardening alloys, NE 4042 and NE 8744; and (3) high hardening alloys, NE 4047 and NE 8749. Properly selected and heat treated, it is expected that these NE alloys will satisfactorily replace the higher alloy content steels formerly used except in very special applications. Table I indicates

the SAE and American Iron and Steel Institute high alloy steels that can be replaced by the six grades of NE steels listed.

TABLE I

The SAE and American Iron and Steel Institute Grades of Steel Replaced by the NE Alloy Steels

NE Steels	SAE and AISI Steels Replaced
Carburizing grade: NE 4023 and NE 8620	2300 2500 3100 4100 4600 5100 6100
Medium hardening grade: NE 4042 and NE 8744	2330 to 2335 3130 to 3135 4130 to 4135 5130 to 5135 6130 to 6135
High hardening grade: NE 4047 and NE 8749	2300 3100 3200 4100 4600 6100

Because, in the past, alloy steels have been developed to meet specific requirements without regard to the type or quantity of alloying elements, it is now necessary to substitute steels lower in alloys in order to conserve dwindling stocks of these vital elements. The new NE steels are the result of this conservation program and contain a minimum of alloying elements. They are, however, of a composition balanced to produce required and adequate physical properties.

The metallurgical section of the War Production Board is anxious to know how the new NE steels perform in service and to what extent they conserve scarce metals. Users of the new steels are urgently requested to report in detail each operation, such as forging, machining, heat treating response, and tool life, as well as the results of any physical or application tests made on these steels. This will enable a correlation of information concerning the steels, which will be made available to other users.

Industrial

By G. F. SULLIVAN
Associate Editor, THE IRON AGE

Metal Spinning

WHEN a newly designed aircraft engine cowling is ready for experimental production, there are three ways in which it can be made: Hand forming, stamping and spinning. The first is slow, not easily duplicated and poorly streamlined; and the second is too costly for experimental work. But spinning has proved to be a quick and inexpensive solution to the problem. Furthermore, when the design is finally accepted and frozen, initial production can be started in a matter of days while high production dies are under construction.

Spinning is not, and probably never will be, a competitor of stamping, for both have their economic limitations. But in at least two distinct processes it has been used as a complement to stamping or drawing. One of these is a case which is described in detail later on, where three different shapes are spun from a single stamping. The other is in the removal of taper from drawings, for wooden spinning chucks require very little taper, and metal chucks need none. An article on this application appeared in THE IRON AGE, Nov. 21, 1940.

Only recently has spinning emerged from the field of small decorative pieces to the point where industry is beginning to appreciate its possibilities. The spinner paraphrases Archimedes, "Give me a lever long enough and I will spin the world." Practically, he means that many a job undreamed of 30 years ago has been licked within the last few years. There is no more limit to the potential size of a spinning than there is to that of a stamping or drawing. Nor is the shape limitation as tight as it used to be; the old assumption that the process was applicable only to

... Spinning is one form of metal working in which the theory and practice have never fully been set down in black and white. This article outlines some of the operating principles of a little known craft that is playing an ever increasing role in industrial metal working.

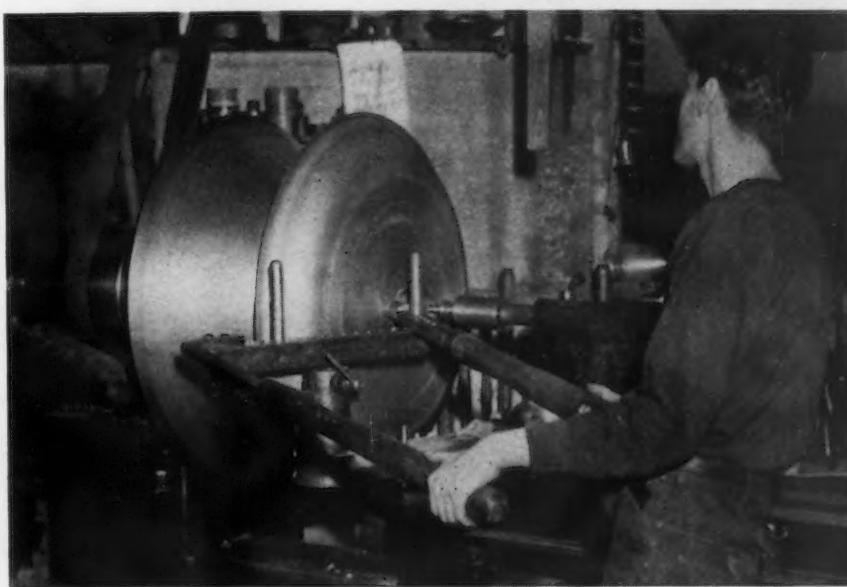
spherical, parabolic and similar shapes has gone by the board. In an article in the Jan. 30, 1941, issue of THE IRON AGE there is a description of a method of forming the unusual curvatures of a streamlined oil truck body by cutting a spinning into a number of pieces and selecting only the ones desired.

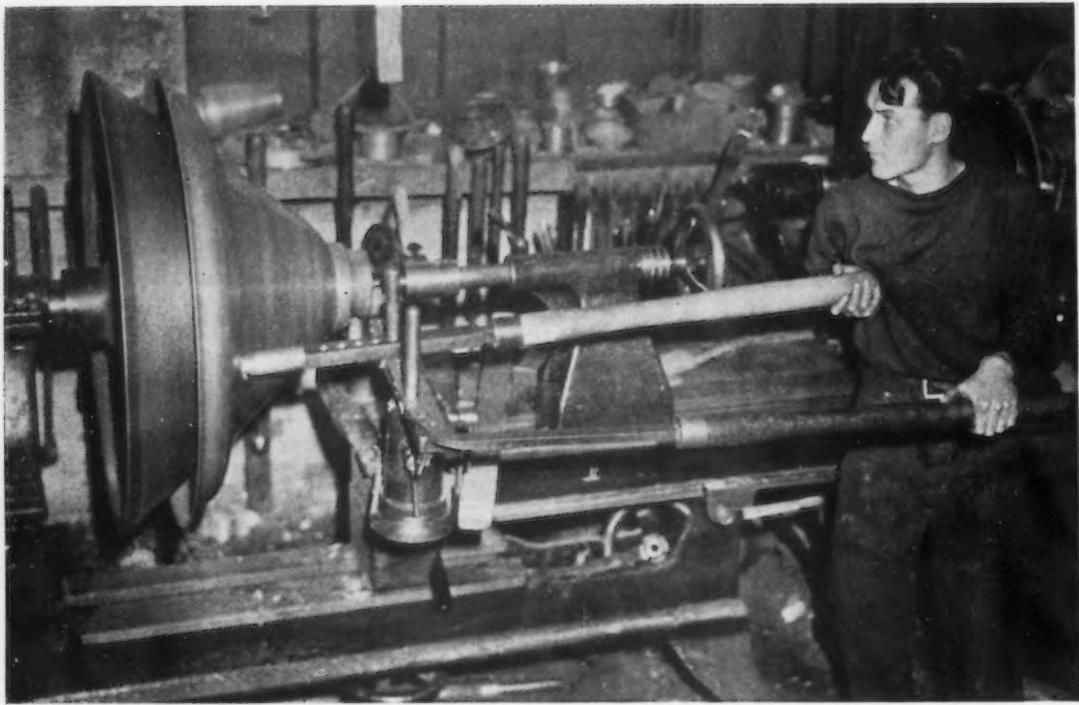
Spinning is a "natural" for research and development work. When peace rolls back the veil of censorship, this little known industry will be credited with playing an important role in experimental and production work in radio, sonics,

aircraft, and even in shipbuilding. The economics of spinning compared with stamping are clearly set forth in a previously mentioned article, and will not be discussed here. But it should be remembered in these days when time is precious, that since the spinner can swing into production in a few days, a die or press breakdown need not completely halt production on any vital item, whose shape and thickness lends itself to the spinning technique.

Pewter, silver, copper and brass were the earliest spinning mate-

FIG. 1—Start of the second operation in the manufacture of an aircraft propeller "spinner". The first operation, consisting of spinning a steel sheet to the shape shown here, was carried out on another lathe.





• • •
FIG. 2—Half-way through the second, and final operation, the steel "spinner" assumes this shape as the operator spins the flaring metal to the shape of the cast iron chuck. He next applies the tool to the area about the tailstock and converts what appears to be excess metal into a blunt nose. The finished product is shown at the right in Fig. 3.
• • •

rials, but the introduction of aluminum gave the industry a boost, for it is considerably easier to spin than either brass or copper. These latter two metals require more mechanical skill than aluminum in order to avoid scratching, with attendant risk of breaking on a deep spinning; and they require frequent annealing and more forming operations than aluminum.

Several years ago an IRON AGE article (Aug. 24, 1939) reported the spinning of stainless steel. Stainless is still a very difficult metal to spin; it work hardens quickly and requires frequent and careful annealing at 2100 deg. F.

The trend today appears to be to cold rolled steel, for in many respects, including cost, it is an ideal material for spinning. It requires

a little more work than aluminum, but somewhat less than brass. Fig. 4 illustrates the difference in the forming properties of steel, brass and aluminum. The comparatively high tensile strength of cold rolled steel enables it to take more working without tearing, and naturally makes for a stronger finished product. Annealing is unnecessary, except for deep spinnings.



• • •
FIG. 3—Frying pans, an amplifier housing, a lamp reflector and an aircraft propeller "spinner" illustrate the range of industrial spinnings. Unusual is the helmet at left rear, an eccentric shape and therefore spun on an elliptical chuck.
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In annealing copper, brass and nickel, they need only be brought to a red heat. Aluminum alloys, like stainless, require careful annealing between operations; dural, for instance, is annealed at 550 to 650 deg. F.

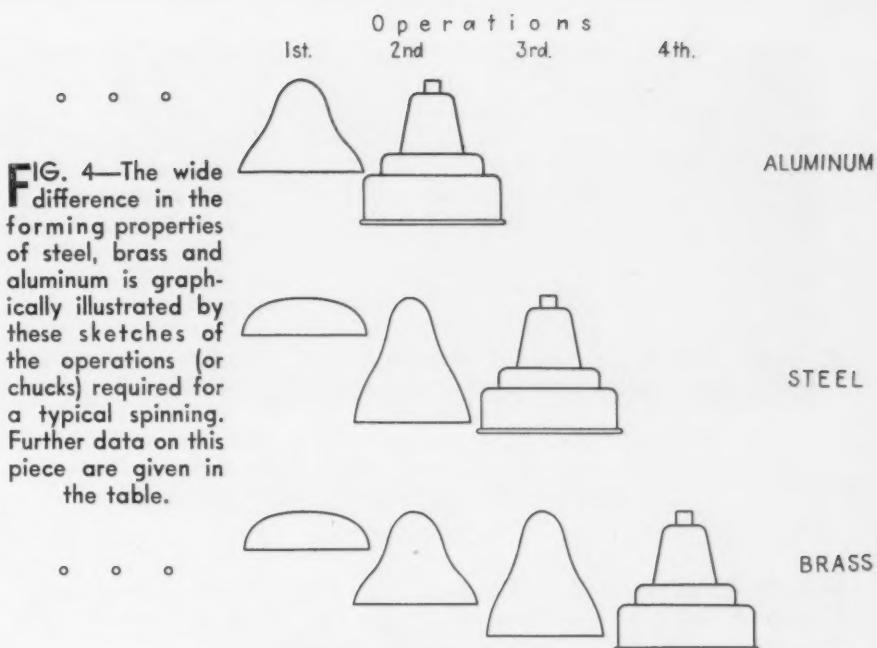
Tools

One of the largest spinning plants in the country is that of Edward Young, in Brooklyn, N. Y. The data and illustrations in this article are based on the work of his plant, which is considered to be among the most progressive in the industry.

Despite the apparent simplicity of the spinner's lathe, Mr. Young has made several improvements to permit the production of larger pieces with less operator fatigue. The principal feature of a 30-in. lathe which he recently designed is the substitution of a 250-lb. tool rest for a 600-lb. rest. The lighter tool support is better braced, easier

* Approximate, and varying depending on the contour being formed.

† Not including annealing between spinning operations.



Comparative Data for the Piece Shown in Fig. 4, Assuming It Is to Be Spun in Three Different Materials

Material	Gage	Material Cost	Labor Cost	No. of Operations	Tool Pressure on Material, Lb. per Sq. In.*
Aluminum	18	40c.	20c.	2	400-500
Cold rolled steel.....	22	5c.	40c.	3	3200
Brass	20	50c.	60c.	4†	450-500

FIG. 5—Spinners' tools shape almost every conceivable contour. Drilled holes in the handles of two tools indicate they are used on the lever type holders shown in the accompanying illustrations. The others are hand tools, held against the operator's chest.



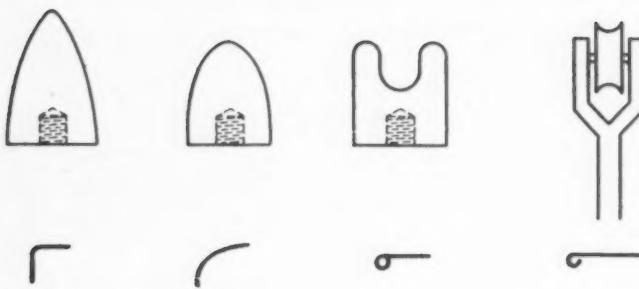


FIG. 6—Spinning tools, and the shapes they form. The two at the right are for beading; the plain one for steel, the wheel for brass, copper and aluminum.

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FIG. 7—Turning a wooden chuck for a 72-in. diameter parabolic aluminum spinning. The lathe is a 110-in. swing, gap type machine, which will also be used to form the spinning.



to handle, and permits the operator to exert more force on the work.

The gap type lathe is preferred for spinning since it permits the production of larger pieces. Fig. 7, made in the Young plant, shows a gap type lathe with a 110-in. swing.

Forming tool tips, Figs. 5 and 6, are improvisations based on years of experience, and are often shaped especially for the operation in hand. The method of applying the forming pressure, from the operator through the tool to the work, is a recent development. Fig. 1 clearly shows the dual lever type of forming tool used in the Young shop. The principal force is exerted at right angles to the axis of the lathe through the long lever. This lever is pivoted on the tool rest of the lathe and moved by the operator's left hand. The tool holder is, in turn, pivoted on this lever. The operator's right hand guides the tool holder in a direction more or less parallel to the axis of the lathe, though it is apparent that any curve can be described by the tool tip through a judicious use of the two arms in combination. The lever handle used on a 110-in. lathe is generally at least 6 ft. long.

In addition to the threaded tool tips illustrated in Fig. 6, brass bar stock, 1 in. in diameter and a foot long is sometimes attached to a shorter holder. Several of these are shown in Fig. 5. This arrangement means less time out for replacing tips, and the bar can easily be ground to the shape desired for the job in hand. Wheels are made in a wide variety of sections, with diameters ranging from 1 in. upward.

The coefficient of friction of the forming tool tip and of the piece to be spun must be different; hence brass tools are used in spinning steel, and steel tools are used on brass, aluminum and copper. The wheel is often used on the softer metals because there is less danger of scoring the metal, a fault which would produce a crack as the metal was spun out. Flowing the metal evenly, the crux of good spinning, is a skill that takes years to acquire.

The lubricant used on practically all jobs in the Young plant is ordinary borax soap. A dry cake is simply held against the revolving work at infrequent intervals. The oil pumps and drum storage of the machine shop are replaced by cartons of soap in the Young plant,

where petroleum lubricants are rarely used.

Forming

In place of dies, the spinner uses wooden chucks, which he generally turns in his own shop. Maple, dogwood, birch or mahogany are the preferred materials, though Masonite can be used for aluminum spinnings because they do not heat up like those of the other metals. Large wooden chucks are attached to the lathe by screwing them to a threaded metal adapter, which is in turn screwed to the lathe spindle. Small wooden chucks are directly threaded. Chucks used for removing taper from stampings and drawings are made of metal, generally cast iron, if specifications call for complete removal of taper, though wooden chucks require considerably less taper than drawing dies. Metal chucks are also used for pieces requiring a polished interior finish.

Spinning resembles drawing in that a number of chucks may be required to produce the desired shape. The physical properties of the various materials determine the number of operations required, as indicated in Fig. 4. The first operation involves cutting a circular disk from sheet stock. Its diameter and thickness are determined by the thickness of the piece to be turned out, coupled with the spinner's knowledge of the flow properties and characteristics of the metal specified. This circular disk is liberally dry soaped, held by hand on the center of the chuck, and clamped in position by the chuck follower mounted in the tailstock.

Thin gage stock, say from 24 to 36, is spun at shaft speeds ranging from 2200 to 2400 r.p.m., regardless of the material. Heavier stock, which may run up to $\frac{1}{4}$ in., is spun at shaft speeds as low as 200 r.p.m.

Typical Applications

Spinning's usefulness in product development may be illustrated by the peacetime problem of a manufacturer of soda fountain equipment. It required only five spinnings to perfect the design of a part for which the drawing dies will cost several thousand dollars. The total cost of the five spinnings was approximately \$100.

A manufacturer of lamp reflectors has worked out a nice com-



FIG. 8—Components, left, of the collapsible chuck used to spin the decorative aluminum piece at the right. The sectioned chuck, or mandrel, was cut into eight pieces with a carving knife.



FIG. 9—The possibilities of spinning in conjunction with stamping are illustrated by these three reflectors, spun from the plain stamping shown with them.

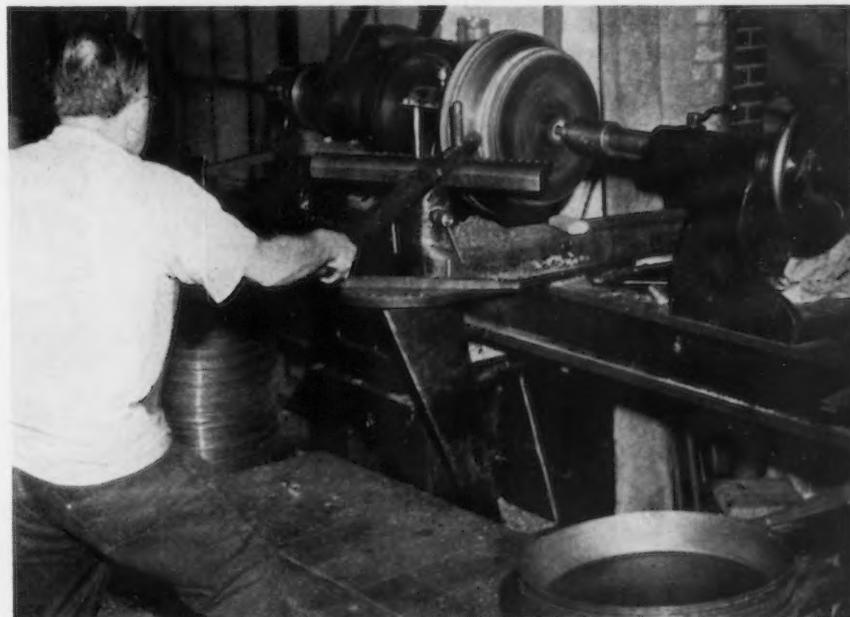


FIG. 10—Spinning a huge frying pan for the armed forces. A wooden disk of the same diameter as the base of the pan is fitted between the heavy steel spinning and the tailstock. It clamps the bottom of the pan and speeds up the operation.



FIG. 11—Stages in manufacture of the steel amplifier housing illustrated at the left in Fig. 3.

bination of spinning and stamping. Fig. 9 illustrates his problem, which he solved by making one stamping and having three different necks spun on. The threads, of course, were applied later.

Fig. 11 shows the sequence of operations in forming the housing for an amplifier, where the quantity required was comparatively small. This particular unit is subjected to very severe service, and as originally spun in aluminum it lacked strength. The second design of the sound-directing part involved two spinnings in cold rolled steel, with the flange and the flared section spot welded together. This de-

sign was tested and rejected for lack of strength at the welds, the final product being made of a single sheet of cold rolled steel. The hemispherical part, a simple spinning, remained the same in all designs, and is not included in the above discussion.

Trend to Industrial Spinning

It takes three or four years to train a man to the point where he can be considered capable of doing ordinary spinning. Mr. Young, who has been a spinner for 40 years, feels that it takes most of a lifetime before a man can be con-

sidered proficient at the craft. Only about 3000 men are engaged in spinning in the entire country, and in many cases their experience is limited to the manufacture of decorative objects, of lamp bases, lighting fixtures and silverware. Hence, no one expects the group to grow by leaps and bounds. The trend in the industry today is toward a greater utilization of its facilities in the manufacture of industrial and war products, and it is expected that this change of emphasis will continue as industrialists become more familiar with its potentialities.

Conserving Alloy Steels By Flame Hardening

BY means of oxy-acetylene flame-hardening, the new NE (National Emergency) steels can be often used as alternates for the standard alloy steels for such parts as dies, shear blades, pump liners, and piston rods. Flame-hardening imparts a maximum hardness to the surface of quench-hardenable steels without changing their chemical composition or affecting the toughness and ductility of the core metal.

Parts can be furnace treated, if necessary, for special core properties and then flame-hardened to produce the desired physical qualities on the surface. Flexibility of the process and careful controls that may be exercised permit the hardening effect to be restricted to only those surfaces where it is needed, and the degree and depth of hardness can be accurately controlled.

While it is urged upon every user of alloy steels to use wherever possible the carbon, intermediate manganese, carbon-molybdenum, manganese-molybdenum, and silico-manganese grades of steel, flame-hardening widens the range of uses for these low alloy types. Flame-hardening equipment is light and easy to operate, consisting of one or more heads which furnish oxy-acetylene heating flames, an oil or water quench, and a means of propelling the heating head and quench at a set speed or of turning the part being hardened.



THIS flame-hardening machine for hardening shafts was made from an up-ended lathe. During hardening, the shaft is rotated and the flames progress upward, followed by a ring quench. Photo courtesy of Linde Air Products Co.

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Care of Flux in

Light Alloy Welding

A GREAT deal of the welding of the light alloys of the aluminum and magnesium series is performed by the flame process, in which the two component parts are homogeneously united with the aid of a stick of metal of similar composition to that of the components themselves, a suitable flux, and an oxyacetylene flame. The aluminum and magnesium alloys are strongly electropositive and, given the right conditions, are prone to rapid deterioration from corrosive influences.

A flux is essential to satisfactory welding, and, unfortunately, all useful fluxes are strongly corrosive and moisture-absorbing chemicals. It is evident, therefore, that however correctly a weld may be executed to give a homogeneous mass in the compositional and metallographic senses, every care must be taken in using flux in the proper manner so that it is where it is required when it is wanted, that its functions are properly fulfilled, and that when the welding operations are completed no flux remains on or in the metal to cause later corrosion. In corroding, the flux does not become exhausted but continues to eat away the metal in a progressive manner, often with gradually increasing rapidity.

The magnesium alloys being appreciably more electropositive than those of the aluminum series exhibit failures from flux corrosion even more rapidly than do the aluminum alloys. With both series, however, troubles can be completely avoided by exercising care in all the factors involved. The same

... The dangers of corrosion by the fluxes used in welding aluminum and magnesium and their alloys have in the past been well known, but welding of these metals is now being undertaken by many to whom the difficulties are new. Therefore, the practical information herein, a summarization of an article that appeared in Metal Treatment, London, on handling of fluxes is particularly timely.

principles apply, but for clarity the two groups will be dealt with separately.

Aluminum Base Alloys

The welding flux has two primary functions to fulfill. Firstly, it has to cater for the natural oxide film that is inseparable from aluminum alloys. It has to take this into solution rapidly and completely over the areas to be joined before welding can be satisfactorily achieved. Secondly, it has to provide a blanket over the heated metal in order to prevent or minimize oxidation during welding. If any oxide is so formed, the molten flux must be available and capable of removing it by dissolution. The function of a weld flux is sometimes compared with that of a solder flux, but it will be noted that, where their roles do coincide, the requirements for the weld flux are the more stringent, and that it has an additional purpose. In consequence, the formulation of weld fluxes is critical, proprietary brands are

almost invariably used, and these are marketed by concerns who have specialized in aluminum alloy welding. Generally, fluxes comprise uniform mixtures of alkaline halides, usually the chlorides and fluorides of potassium, sodium and lithium.

All the constituents of the flux tend to be corrosive towards aluminum alloys, and actively so under damp conditions. The latter inevitably arise due to the deliquescent nature of the flux mixture. Contact is therefore rapidly followed by attack, the primary reaction being towards the production of alkali aluminate and aluminum halide. Aluminum halide is hydrolyzed in the presence of moisture to aluminum hydroxide or basic halide and with the libration of halide acid, either hydrochloric or fluoric acid. This immediately attacks more aluminum, forms halide, which in turn is again hydrolyzed to acid. So the cycle goes on, corrosion proceeds progressively until the aluminum is consumed. It is not un-

usual for welded joints that have not been effectively freed from flux to corrode through and fail completely within a few weeks.

Complete removal of flux from a welded joint is not so simple as would appear at first sight, and effective treatment can only result from the proper observance of a number of principles. The flux should be used sparingly, applied in the proper manner, contamination of adjacent surfaces by splashing or handling avoided, and the junction, whenever practicable, designed to minimize flux inclusion. Washing treatments should follow immediately after completion of the welding operation.

The standard technique for applying flux is to heat the end of the weld stick, dip it in the flux and so withdraw a tuft of the powder. Then, by inverting the stick and warming it, the flux is forced to run down the stick and provide a glaze extending about six inches. No flux is applied directly to the job, the reservoir of flux on the stick feeding where it is required during the actual welding process. In this way only is it possible to provide adequate flux for the purposes required, yet to conserve its use, minimize splashing and spread over surfaces, and to keep the amount driven between mating surfaces as low as possible. There are, of course, a restricted number of specific instances when application of flux to the job itself cannot be avoided, for example, in joining very thin gage sheet.

Incidentally, it should not be necessary to stress that work for welding must be clean, free from oil, grease, corrosion products and extraneous dirt. Trichlorethylene degreasing is sufficient in most cases, but scouring with a stiff wire brush is additionally useful for dirty work.

The most favorable design for welding is the butt joint, although again this is not always practicable. The aim should be to achieve penetration of the weld metal through the thickness of the junction. Hence an appropriate diameter of weld stick must be chosen. The thicker gages of sheet should be beveled at the junction edges to promote penetration. Very thin gages can have the edges turned up to a flange instead of using a weld stick. Thoroughly satisfactory welds can be obtained if these principles are followed, relatively easily performed after-washes and with very

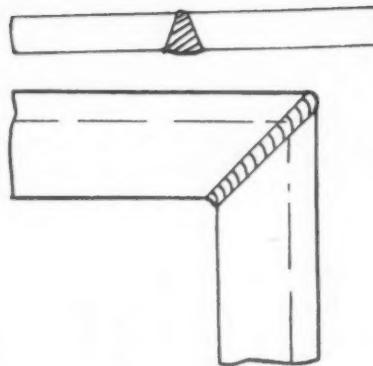


FIG. 1—Butt joints in welding sheets or sections.

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little risk of flux being retained in the weld to cause later trouble. On the other hand, if lap joints are used, it is not obvious that improved strength will result, and after-washings are more complicated and efficiency of flux removal difficult to insure. In fact, if both junctions of the lap are welded, flux retention is almost certain.

The same principles apply in the welding of bar and section material. Fig. 1 shows the butt joint in the second section and how this is the preferred set-up from the way in which the weld metal penetrates, forcing the flux before it. Fig. 2 shows the lap joint, and how with single or double welding, it is inevitable that flux is driven into the interspace of the lap and retained there. The principle of the butt joint can be applied to all junctions.

After Treatment of Welds

The details of the after-washing have to be determined by the design of the weld, butt or lap, and ease of accessibility. In all cases, the treatment comprises thorough

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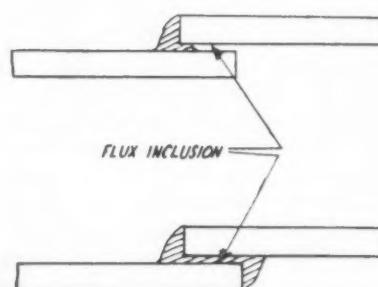


FIG. 2—Lap joints in welding sheets show the flux inclusions.

water washing and brushing as soon after welding as possible. With simple flat surfaces butt welded, a combination of soaking and brushing in warm water followed by a thorough swill in flowing hot water suffices. Thus two wash tanks are essential. With lapped joints and complicated structures, a minimum time of 10 to 15 min. in first and second waters, each of which should be about boiling point, is necessary.

If the welds have to be left for a period before washing, corrosion starts, and vigorous wire brushing should be applied to assist removal of the corrosion products. Acid rinsing assists in the removal of such deposits, and some workers advocate an immersion in warm dilute nitric acid (2 to 5 per cent strength) for a few minutes for this reason, while others use the "satin" finish dip process, comprising a quick dip in 5 per cent cold caustic soda solution followed by water rinsing and the nitric acid immersion. Wherever laps, crevices, holes, etc., are concerned, it must be borne in mind that prolonged water washing is required to remove these chemicals from such interstices.

For large structures that cannot be immersed, a steam jet is sometimes used, playing it upon the flux and especially directing it upon crevices. Water spray must follow to rinse off the condensed steam that carried the flux over other areas. The steam jet by no means readily loosens the cake of flux around the weld, it does not easily penetrate seams, and, in itself does not provide a really good "flush." It is recommended, therefore, that the steam jet should be reserved for those structures only that it is impracticable to wash by immersion because of their size, or for welding carried on at a permanent erection.

One American practice uses acid dips, and for large structures, the welding of which may be extended over a considerable period of time, requires such work to be washed at intervals so that no weld is left untreated for more than three hr., rather than wait even for the completion of a working day. The first process is a water wash in flowing water at a temperature of 203 deg. F. minimum for half an hour. Brushing is resorted to where practicable during this swill. The second process is immersion in sulphuric acid of 5 per cent strength at 149 to 158 deg. F. for half an hour. The

third process is water wash in flowing water at 203 deg. F. minimum for half an hour. It will be noted that the full treatment is a very thorough one, indicating the attention warranted to the avoidance of flux corrosion.

It should be noted that sulphuric acid anodization processes are popular in America, and when these follow flame welding, only the first of the above three washing processes is given. The anodization in sulphuric electrolyte covers the second, and the water washes following it the third process. But such anodized work is finally "water sealed" by 30 min. immersion in boiling water.

The American treatment includes a simple control test for properly washed welds. This uses a 2 per cent solution of silver nitrate acidified with nitric acid and a percentage of the welds are tested by placing a few drops of this reagent on the weld. Absence of a white precipitate indicates complete removal of chlorides and efficient washing.

Much work has been carried out in England on the subject of weld washing beyond the studies on straight water and acid dips upon which the foregoing recommendations are based. The use of a suspension of lime in water in which to immerse for a prolonged period after an initial rinse has been studied. The object of this is "to kill the flux" by an excess of an inert alkali which neutralizes acidity. This has not proved a general success because in the first place the lime suspension does not penetrate seams as readily as desired, and in the second place, the calcium chloride so produced is still virulently corrosive and its activity is only partially counteracted by the excess of lime present.

Chromate treatments after the preliminary wash have also been investigated, but it is believed they serve little or no useful purpose towards eradicating the after effects of flux.

Magnesium Base Alloys

All the principles and criteria put forward for aluminum welds free from flux troubles broadly hold good in the case of magnesium welds, but it must be stressed from the outset that, with the magnesium base alloys, rigorously controlled techniques must be followed without any compromises. Otherwise failure is certain.

Magnesium and all its light

weight alloys are highly reactive metals that do not acquire a natural oxide film having protective properties in the manner that aluminum alloys do. They rapidly corrode even in normal atmospheres and under severer conditions of marine or industrial atmospheres, deterioration is rapid. To safeguard the raw material in transit, whether it be in the form of sheet, rod, strip or section, or as castings, it is the

base metal is significantly more rapid than it is with aluminum under otherwise similar conditions.

The metal to be welded must be thoroughly clean, and in addition to degreasing, it is important that the chromate protective film be removed from the areas concerned with the welding. This portion of the cleaning should be done immediately prior to welding, using abrasive paper or stiff wire brush.

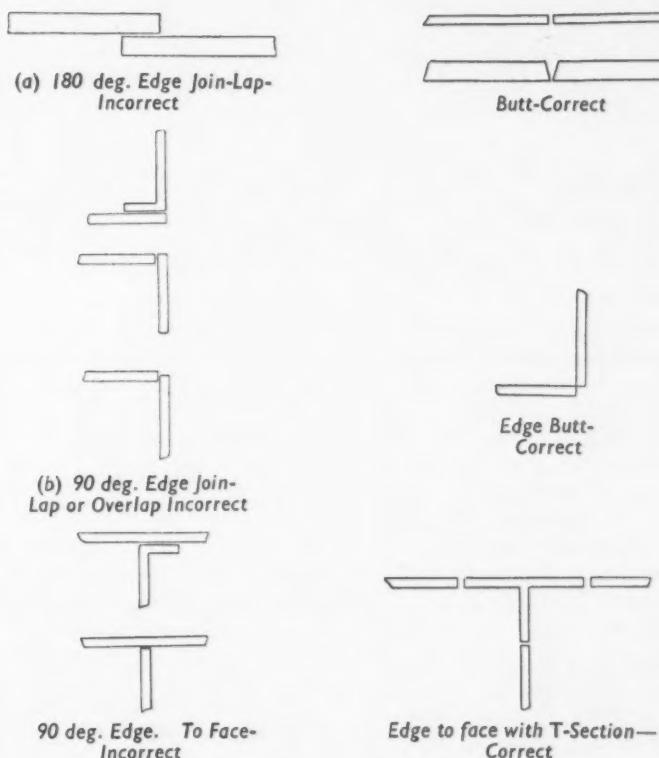


Fig. 3—Arrangements for magnesium welding.

practice to apply a "chromate" finish. This is a film acquired by immersion under controlled conditions in a chemical solution. It has restricted qualities of protection under conditions of dampness in reasonably good atmospheres. It has no resistance to corrosive weld fluxes and therefore those accustomed to handling raw materials that are chromated must not be misled, and must appreciate the limitations of this protective coating.

The fluxes for magnesium, like those for aluminum, are deliquescent corrosive mixtures, purchased as proprietary brands. The magnesium salts formed by reaction with this flux absorb moisture from the atmosphere, hydrolyze to acid which attacks the metal, and then the cycle is repeated over again. The rapidity of attack and therefore of the eating away of the

The weld rod must likewise be cleaned.

Designers must appreciate from the beginning that there is only one type of joint: The butt. Lap joints in any modification are unacceptable because removal of flux from them is impossible, and no weld is satisfactory unless flux is completely eliminated. The design must be such as to facilitate manipulation in the welding operation, ease of access uniformly along the weld and penetration of the weld metal through the junction to the reverse side with minimum of filing or machining for neatness.

With straight butt joints, the thicker gages of sheet are chamfered to promote penetration. With 90 deg. edge joins, the junction must be inner edge to inner edge, thus leaving a full V for welding, and not overlap or partial over-

lap which would cause an unsymmetrical weld, a weak junction and flux inclusion. An edge to sheet join is inaccessible for the welder to achieve successfully, flux inclusion is probable, and a weak join inevitable. The only simple solution in this case comprises in effect three welds using a T-section for the junction. Correct and incorrect procedures are shown diagrammatically in Fig. 3.

Contrasting with aluminum welding, flux is applied both to the stick and the job, in the latter case to both sides of the two mating edges. It is, however, applied preferably with the weld rod, which is glazed with flux by picking up a tuft of flux on the warm weld stick and running down with the oxy-acetylene flame. Generally, the job, rigidly located in a fixture, is first tack-welded at a few equally spaced points. The fluxing of one side is simultaneously effected. The work is then carefully hammered flat, and the reverse side fluxed. It is then returned to the fixture and the welding completed from the first side. If preferred, the flux can be applied from a methylated spirit solution of the powder. Moisture should be rigorously avoided, and, for this reason, containers of flux kept well sealed.

The weld rod must be of same composition as the alloy to be welded. Its diameter must be appropriate to the job, and likewise the size of flame adjusted to the optimum size, so that full penetration of the join is achieved with no tendency to deficiencies at isolated points. These deficiencies are often accompanied by flux inclusion. Therefore it is better to err on the side of excess metal to clean off rather than irremovable flux.

The needs of flux removal must be given attention as soon as the work is reasonably cool from the welding operation; no period of

lying in wait can be tolerated. In the case of a structure upon which welds are being made at short intervals of time, each weld must be separately washed. If a very large number of welds are to be made in rapid succession on the same structure and these involve a long period for completion, a suitable number of intermediate washings should be introduced.

With the welding technique properly followed, only superficial flux, some of which may be "caked," and corrosion products, should have to be dealt with, and these can be satisfactorily eliminated by simple scrubbing and water washing. Hot flowing water is required and scrubbing with a hard bristle or steel wire brush, giving care to insure that all areas involved are freed from adherent flux or corrosion compounds. A very thorough hot-water wash in a separate tank of flowing water must follow to remove all the flux contaminated water from the first washing. If more welds are shortly to be made, the work can be dried off. If welding is complete, work must pass to a chromating operation in order to protect the welded areas for storage. If it is desired to accumulate work over a period of several hours for this operation, then it can advantageously be "stored" for this purpose by completely immersing it in a 5 per cent aqueous solution of potassium bichromate.

Regarding the chromate process itself, any one of the recognized processes can be used. Many of these are patented; they can be regarded broadly as rapid and slow processes. If very close dimensional tolerances are involved, an appropriate solution must be chosen, usually one of the slow ones.

A typical general purposes solution is prepared from 1.8 lb. of sodium dichromate crystals and 1.8 pts. of nitric acid (S.G. 1.42) per

gal. of water. It is operated at ordinary temperatures and immersion times range from $\frac{1}{2}$ to 2 min. With the maximum time of immersion, dimensional loss is 0.005 in., maximum. After immersion and draining, work is thoroughly rinsed in hot water and dried off.

A solution having negligible influence upon dimensions is the alkaline ammonium sulphate-dichromatic mixture, namely:

Ammonium sulphate	4 $\frac{1}{2}$ to 5 oz.
Sodium dichromate	4 $\frac{1}{2}$ to 5 oz.
Ammonia (S.G.O. 880)	0.4 fluid oz.
Water	1 gal.

This solution is operated gently boiling, and treatment times range from 20 to 60 min. Washing and drying follow.

Another simple solution uses $\frac{1}{2}$ lb. of each sodium and potassium dichromates per gallon, gently boiling, immersion times between 1 and 2 hr. Effect upon dimensions is nil.

In conclusion, it can usefully be reiterated that with both series of light alloys, weld corrosion must be avoided, and this can be achieved by giving full attention to design of join, application of flux and prompt attention to after-processes for its removal. With correct technique, inspection for the proper carrying out of these after-treatments is easily performed. The works chemist is best equipped for this duty, and in fact his co-operation in the maintenance of proper water flow, correct balance of all the chemical solutions as well as for carrying out tests on the work itself, is regarded as indispensable. In practice, instances have occurred of failures due to flux retention of aluminum welds within three months, and of magnesium welds within a week or so. Obviously such waste of material and labor effort must be avoided by giving the necessary care and control in fabrication.

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Tubes Expanded to Bond Fins of Cooling Coils

AN interesting process is used by the Thane Co., La Crosse, Wis., in assembling fins on the copper tubes of cooling coils. The fins, which are continuous across the entire width of the coil, are perforated and flanged in six operations to form the holes through which the tubes will pass.

The fins are then racked on the tubes and a nitrided steel "bullet" forced completely through each tube. This operation, shown in the illustration, is effected by an air hammer. Forcing the bullet through the tube, which has a wall thickness of 0.035 in., expands the tube to form a permanent mechanical bond with the fins. It also holds adjacent fins in such close contact with each other that it is



difficult to tell by inspection which side of the fin carries the flanged collar. Soldering or brazing is ren-

dered unnecessary, and contraction or expansion does not affect the efficiency of the joint.

Cold Heading Die Quenching Fixture

AN ingenious method of quenching solid dies for cold headers has been devised by H. C. Griggs, metallurgist, Waterbury - Farrel Foundry & Machine Co., and described in the May issue of the E. F. Houghton Co.'s *War Production Data*. Cylindrical dies used are of various sizes, an average being 2 in. long with an o. d. of 2 in., and a $\frac{1}{4}$ -in. hole through the center. They are of straight carbon or carbon-vanadium steels, and are the solid die design.

These dies must be filed hard inside, with a Rockwell "C" hardness of 66 as quenched. The external hardness, being unimportant, runs only about 31 Rockwell "C." After forging, rough machining, and heating to 1550 deg. F. for periods of time varying with the die size, the die must then be quenched so as to provide great internal hardness, yet have a relatively soft exterior for greater strength without stress. This was found to require a drastic pressure water quench inside the die, with practically an air quench on the external surfaces.

To accomplish this type of

quench, a special fixture was built as shown in the accompanying sketches, Fig. 1, showing a cross-section vertically and Fig. 2 showing a top elevation of the fixture itself, which holds the die in place.

City water, used at normal pressure, is fed through a flexible hose A, and flows through a rifled tip, B, providing a whirling spray. The hot die, quickly removed from the

furnace, is inserted in the jaws of the fixture, C, which are tightened by the hand wheel, E. The quenching fixture, F, is then lowered by a ratchet handled, D, to compress the tip of the nozzle, B, tightly on the die. Water is then turned on for a quench of a few seconds. This is a simple, but very effective device for the work, and can be duplicated in any machine shop.

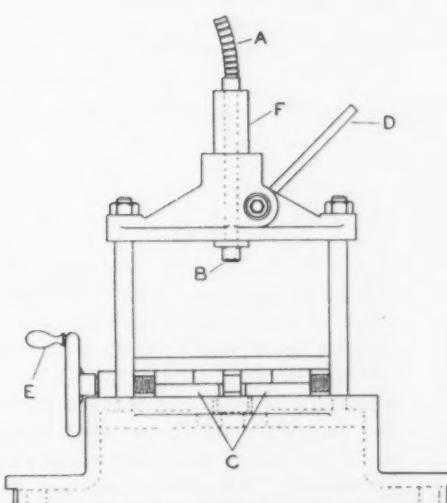
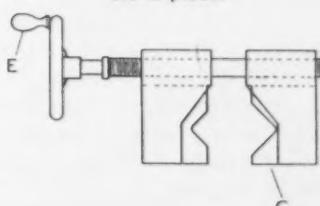


FIG. 1—A vertical cross-sectional view of the die quenching fixture.

• • •

8 BELOW

FIG. 2—The top elevation of the fixture itself, which holds the die in place.



Silicon Bronzes

By E. G. JENNINGS

and

HAROLD J. ROAST

Canadian Bronze Co., Montreal

... Many tin-bearing bronzes are now being replaced by copper-silicon-iron bronzes, within the limits of their applications. This article outlines foundry practice, physical properties and applications of the silicon bronzes.

THE increasing use of silicon bronzes has necessitated a more complete understanding of their foundry qualities and typical physical properties. This article describes the general methods used in producing copper-silicon-iron castings in either green or dry sand molds, and outlines the molding technique employed.

Because these alloys have excellent physical properties and contain no tin they are being frequently specified in place of red brass, gun metal, phosphor bronze and similar alloys. The following are representative chemical specifications of the silicon bronzes described in this article, and marketed under the trade name F. M. G.:

	Per Cent
Silicon	1.4 to 4.0
Iron	0.5 to 3.0
Zinc, maximum	4.0
Manganese, maximum	1.5
Phosphorus, maximum	0.2
Other ingredients, maximum	0.15
Copper	remainder

For bearings under extreme loads, such as turn-table bridges, the silicon is raised to the neighborhood of 2 per cent and the iron to 3.5 per cent. Silicon manganese bronze, with characteristics similar to the high and low manganese bronzes, can also be made. In any case, silicon is the impor-

tant alloying element, entering into solid solution with the copper.*

*C. S. Smith, "Silicon Copper Constitutional Diagram," A.I.M.E., 1930.

For the alloys under discussion the foundryman is supplied with a hardener in small ingot form, ready for alloying with copper. The addition of this hardener covers almost every bronze from high conductivity copper to that of bell metal and high compression alloys, not excluding silicon manganese bronze. Natural or forced draft pit fired furnaces, indirect arc electric, and oil furnaces of the revolving type are among the units which have been used to melt these alloys. In using pit-fired furnaces the following procedure has been found to give the best results: Place sufficient ordinary bottle glass, free from lead, into a clean red hot graphite crucible, to subsequently form a suitable cover. Then charge alternate layers of copper (in ingot, anode or trolley wire form) and small pieces of the hardener, until the crucible is full. The metal should not be high enough in the crucible to prevent the close fitting of the crucible bottom, which is used as a cover. As the charge melts down, additional copper and hardener are added until the charge is complete. The copper should not be first melted and the hardener

added later, for if this is done the copper oxidizes to a greater extent than the hardener is capable of rectifying. In melting in an indirect arc electric or an oil fired furnace it is still very desirable to have a good cover of glass, the copper and the hardener being charged together as in the case of crucible melting. Overheating, though uneconomical, has not been found to be inimical to these alloys. Ladles should have acid firebrick linings. The silicon bronzes are no more erosive on crucibles than ordinary bronze.

Tests have been made remelting the metal six times, and in each case sound castings were produced and satisfactory physicals obtained, though the chemical analysis showed a slight loss in silicon and a slight increase in iron.

Molding Practice

The copper-silicon-iron alloys are all very fluid and high pouring temperatures are not needed. It is not necessary that the molds be rammed hard and no wet swab of graphite is advisable, although a dry coating of graphite may be employed.

A fairly open sand should be used. For small castings, green sand to A.F.A. classification 1-F is quite satisfactory. The moisture content should be between 5.5 per cent and 6.5 per cent. The authors used Albany sand, A.F.A. classification 1-F. Castings of complicated design and heavy cross-section should be made in dry sand. If wet sand is used for green sand molds on a fairly heavy cross-section, or if there is excessive swabbing in the same connection, the casting will be found, upon machining, to have an outer layer of soft brick-dust material, very different to the true metal beneath.

Any good core sand mixture is satisfactory, providing it has plenty of permeability and is sufficiently soft to take care of heavy shrinkage areas of the mold.

While the copper-silicon-iron alloys do not have anything like the problems of high shrinkage associated with manganese bronze, aluminum bronze, etc., nevertheless, it is wise to consider them as half way between gun metal and manganese bronze. In this connection, the authors feel that frequently not sufficient attention is paid to the elimination of shrinkage areas even in such ordinary alloys as eighty-five and three five's, gun metal, etc.

Top pouring through basin and strainer gates, as per Cartwright and Brisbois†, has been satisfactorily used in large castings such as turbine runners and large pressure discs.

Large castings as a rule should be cast between 1900 and 2000 deg. F. and small castings from 2050 to 2200 deg. F., bearing in mind that the really important temperature is not that of the metal entering the mold but the temperature gradient within it. The pouring temperature is merely an arbitrary means of attaining the optimum temperature gradient.

Machinability

The copper-silicon-iron alloys are machined readily in a similar manner to mild steel, gun metal, or other non-leaded bronzes. According to Bedworth and Weaver‡, "Tools should be high-speed steel with cutting angle similar to that used on brass except that turning tools should have slight top slope." By adding 0.5 per cent lead to these alloys, they will be found to machine like ordinary brass machine

stock or steam metal. This addition of lead somewhat reduces the physical properties. However, in cases where production machining is "the sine qua non," the addition of lead will be found to more than counter-balance the slight drop in strength.

†C. Brisbois and A. E. Cartwright, "Risers or Gates for Some Special Non-Ferrous and Alloyed and High Test Iron Castings," *Transactions, American Foundrymen's Association*, vol. 46, pp. 219-256 (1938).

‡H. A. Bedworth and V. P. Weaver, "Castings of Copper-Silicon Alloys," *Transactions, American Foundrymen's Association*, vol. 44, pp. 193-210 (1936).

The copper-silicon-iron alloys are readily welded with rods or electrodes of the same composition by the oxyacetylene or electric arc methods, and they can be successfully welded to steel. The voltage at the machine should be between 42 and 48, with the voltage at the arc itself between 22 and 28. The amperage taken at the arc should be 285.

Extensive tests clearly indicate that copper-silicon-iron plate composed of 80 per cent copper and 20 per cent hardener can be welded satisfactorily by the metallic arc method with extruded rod electrodes of the same type alloy containing 84 per cent copper and 16 per cent hardener, provided the electrodes have been made by dipping in the proper molten flux, and general procedure carefully adhered to, including the use of reverse polarity. That is, the work is negative and the electrode positive, d.c. being used.

While the evidence indicates that defective structures can be welded satisfactorily, it was also found that it was quite a simple matter to produce defective welds by following ordinary steel welding pro-

cedure and not adhering carefully to established practice for this type of work.

Physical Properties

As the table indicates, wide variations in physical properties are obtainable. These are secured by varying the proportions of the normal constituents and by the addition of small proportions of other elements such as lead, zinc, aluminum and nickel. The wearing, or bearing, properties of copper-silicon-iron bronze, without lead, are equal to those of gun metal and phosphor bronze, but none of these alloys are as good for bearings as the leaded bronzes. In general, its acid-resisting qualities are superior to regular tin bronzes, even including leaded bronzes. Used in turbine and pump runners the copper-silicon-iron bronzes show superior resistance to the effects of cavitation.

While in the early days of the development of the copper-silicon-iron alloys, some seven years ago, there was a certain halo of uniqueness thrown about them, it is now felt that any well organized foundry can handle them satisfactorily if reasonable precautions are taken.

Physical Properties of Copper-Silicon-Iron Bronzes (Cast in dry sand)

Tensile strength, lb. per sq. in.	
in.	42,000 to 62,850
Yield point, ¹ lb. per sq. in.	
14,000 to 38,500	
Proof stress, ² lb. per sq. in.	
12,500 to 35,000	
Elastic limit, ³ lb. per sq. in.	
7,500 to 17,500	
Elongation, per cent	
60 to 8	
Brinell hardness ⁴	
88 to 150	
Izod impact, ⁵ ft.-lb.	
60 to 6	

¹ Extension, while load is on, of 0.01 in.

² Permanent set of 0.1 per cent (0.002 in. on a 2-in. gage length).

³ Load carried by specimen which, upon release, gives a permanent set of 0.00005 in.

⁴ 120-kg. load with 2-mm. ball applied for 15 sec., taken on inside of cross-section.

⁵ 120 ft.-lb. pendulum swinging through the usual arc.

Silver Additions To Copper

IMPROVING copper by small silver additions has been recently gaining serious consideration. Silver is especially useful in copper which is to be soldered, as the heat applied does not result in undue softening of such an alloy. In commutator bars, for example, a small percentage of silver insures that hardness will be maintained. Fractional percentages of silver in photo engravers' plates prevent the softening of cold-rolled copper sheet while it is processed at elevated

temperatures. Some commercial copper alloys designed for high conductivity contain about 1 per cent of silver and over 95 per cent of copper, though hardening elements such as beryllium, cobalt, cadmium or tin may be added.

Silver is often an important element of brazing alloys in which copper, even up to 85 per cent, is one ingredient, but in these alloys 10 per cent or more of silver is commonly used. High fluidity and

good penetration into small clearances, as well as low melting points are among the advantages gained by the use of silver in such alloys.

There are, however, many silver alloys, including coin silver, sterling silver and alloys containing refractory metals or carbon which are employed effectively in electrical contacts and which possess other properties such as greater hardness and superior abrasion resistance, for example, as compared with fine silver.

Health Hazards In

COMPARED with arsenic or lead, the toxicity of magnesium is low, but the increased use of magnesium in war industry has increased also the prevalence of magnesium hazards which have been almost unknown previously. A new kind of gas gangrene threatens workers in war industries unless care is taken to guard open cuts and wounds from magnesium splinters and dust, according to a recent report by Dr. Carey P. McCord, of the medical department of Chrysler Corp. in Detroit. Gas gangrene, according to the usual definition, is a highly fatal disease that is the result of the contamination of the wound with one alone or any combination of certain anaerobic, toxin-producing, spore-forming bacteria. Gas gangrene is characterized clinically by local death of tissue (necrosis) and edema, the collection of gas in the wound, and general blood-poisoning (toxemia).

Wound infections are comparatively rare in civil life, but war wounds often become infected. Metallic magnesium and some of its alloys have been found to produce a unique gaseous condition when they get into wounds. The condition is similar to bacterial gas gangrene, but it is caused by the magnesium instead of by germs.

This kind of chemical gas gangrene has been very prevalent in German industries, with as many as 5000 cases in 1939 alone. Extended studies by Doctors Carey P. McCord, Stuart F. Meek and Gordon C. Harrold, all of the Chrysler Corp.'s medical department, showed the danger of not cleaning out all metal particles or all metal dust from a wound in which magnesium particles, although small, might be involved. Experimental rat wounds in which small particles of magnesium had been introduced, promptly lead to hydrogen gas formation in the tissues of the body. This was in remarkable contrast to other wounds which were contaminated with most metals, glass and wood. The quan-

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ity of gas was extensive in the magnesium-contaminated wounds and if neglected probably would produce a condition akin to a chemical gas gangrene.

In the presence of magnesium particles, it was discovered by the research workers mentioned above, that hydrogen was evolved from the fluids of the body tissues themselves, and, if the metal was not immediately extracted, would form a gaseous tumor. Thus the injuries resulting from not cleaning all magnesium particles from wounds appeared much more serious than ordinary industrial injuries.

The danger of this effect of magnesium in wounds, according to the report of Dr. McCord, calls, in the first place, for special preventive procedure against accidental industrial injuries where magnesium particles might be involved. In the second place, it calls for the availability of immediate proper and experienced medical care. The conclusion of these important researches is that the removal of all metallic magnesium apparently is vital.

A description of peculiar cutaneous injuries caused by implanted particles of magnesium and other light metals has been in *Light Metals*, London, during the past year. According to this report, injuries caused by light metals tend to pursue a course characteristically different, and more severe, than those resulting from the heavy metals. The examination of 5000 instances of such injury has enabled the investigators to establish the fact that two well defined types of injuries exist.

In the first, a visible particle of magnesium or light metal is found. If the injury is not treated, there ensues, in two or three days, a rapid and progressive inflamma-

tion of the site of the injury and of the neighborhood lymphatic system. Vacuole (cavity) formation occurs in the tissues as a result of hydrogen formation consequent on chemical reaction between the metal and the fluids in the tissues.

In the second type of injury the causative agent is magnesium dust or another light metal dust, which enters a wound resulting, probably, from some other accident. The wound heals rapidly, but a painful granulomatous infiltration occurs and it may persist for months. Subsequently, these suddenly develop acute symptoms of inflammation, as in the first type of injury although of a different character.

Another condition, produced by working with magnesium, is magnesium metal fume fever, a condition similar to the well-known industrial disease called brass founders' chills, metal ague, zinc chills, spelter shakes, etc. This disorder follows exposure to recently produced magnesium oxide and may be expected when the magnesium is in molten form. Characteristic for this fever condition are its brief duration and absence of after-effects.

Chills and fever come on usually after the worker has left work and last for one or two hours, rarely longer. The body aches all over like in the grippe. Nausea and even vomiting may occur. Weakness, lassitude, or exhaustion are common complaints. In mild cases the worker may lose no time from work by merely changing his job or receiving better protection. Magnesium metal fume fever rarely lasts more than one or two weeks. The most important prevention is control of the toxic fumes at their source.

A third form of magnesium poisoning, although less well established, represents a spastic gastroenteritis, the inflammation of stomach and bowels which is characterized by abdominal pain, a sensation of pressure, loss of appe-

Handling Magnesium

ite, constipation and loss of weight, and sometimes also an inflammation of the bladder (systitis). A survey in the Journal of the American Medical Association shows that this may be caused by inhalation of magnesium oxide. It has been produced also by the ingestion of 4 gm. of finely divided metallic magnesium over a period of 44 days. The literature describing this type recognizes the possibility that traces of manganese, copper, silicon and aluminum, along with the major constituent, magnesium, may have contributed to this disorder.

The chief practical danger from magnesium, according to the same report, centers about its ready inflammability and explosibility when in the form of fine dust. Its danger is increased through the presence of oils. The necessary personal protection against flame injuries is likely to assure practical protection against disease states with the exception of injury to the skin, which apparently may be produced by single minute particles. Protection calls for the wearing of flame proof clothing which should be kept free from grease and oil. The surface of such clothing should be smooth and tightly woven to prevent the entry of sharp particles.

In machining, large quantities of cooling agents should be employed to eliminate explosion reactions, and most of all there should be provided adequate dust exhausting facilities. In the presence of magnesium fires, obviously water or other liquid extinguishers are not suited, but instead, resort should be had to sand, talc, iron shavings, or asbestos mats for smothering purposes. Furthermore, there are several chemical and mechanical extinguishers on the market that have proved quite effective and relatively economical. Lastly, it is noted that in plants handling large quantities of magnesium, explosion walls and other special features to eliminate or confine fires and explosions should be introduced.

... A new kind of gas gangrene must be guarded against in war industries that make, fabricate, or handle to any extent the light metals, especially magnesium. Investigations show that other industrial health hazards exist from the use of these metals.



• • • **T**RIMMING gates and risers from a magnesium sand casting at one of the plants of the American Magnesium Corp.

Specification Plating

By T. E. LLOYD

Associate Editor, THE IRON AGE

... The recovery of over and under machined parts as well as worn parts is becoming increasingly important. Here is how one plating firm set up its shop to handle only specification plating.

AS the war progresses and industry finds it increasingly difficult to get materials and supplies, attention turns more and more to salvaging parts that have heretofore been declared unfit for service either because they are badly worn or because they were over or under-machined during manufacture. Where parts can be found that are not broken or too badly worn, electroplating is often coming to the rescue. These misfit parts are being built up by nickel and chromium plating, machined back to the proper size, and put back into service.

One of the newcomers into the field of specification electroplating

is Platex, Inc., at New Rochelle, N. Y. One of the firm members, David Maitland, was in the plating business in France, and the business was fundamentally specification plating, running all the way from the very delicate chromium plating of trombone and trumpet pistons to plating the huge turbine journals of super-steamships.

Maitland's latest work in France before returning to the United States was reclaiming worn and undersized parts of French military airplanes through nickel and chromium plating. Because of the necessity for sub-contracting parts to small manufacturers, French aircraft builders found that the

demand for speed and the lack of skilled labor and precision equipment in some of the smaller plants, resulted in an enormous percentage of rejects in plane-parts production. The reclamation of these misfit parts was vital to the French aircraft builders during the early months of the war. The organizers of Platex, Inc., with this highly specialized background, equipped their plant in the United States to handle what they believed a restricted but similar situation.

The plating shop set-up, shown in Fig. 1, consists of 15 plating tanks of 500-gal. capacity each. One tank is for still degreasing in detergent solutions, one for electro-



FIG. 1—A view of the tank arrangement in the shop.

cleaning, three are lead lined for pickling, one is for electro-pickling, one is rubber lined for nickel plating, and the remainder are for rinsing. All tanks are 8x3x3½ ft., and the plating tanks are equipped with adequate force draft ventilation to exhaust tank fumes. Overflow from rinse tanks and the drains from plating tanks are disposed of through trenches in the asphalt covered flooring of the building.

The electrical facilities in the plant, shown in Fig. 2, while not extensive, are arranged to suit definite requirements. A 600-amp. 220-volt, three-phase, 60-cycle, a.c. line services the 2500-amp. 6-volt, Hanson-VanWinkle-Munning motor generator as well as a 6000-amp. generator. The baths are serviced by a 1500-amp., 10-step rheostat giving minimum variations of 5 amp. on the load. Accessory electrical equipment consists of a 25-hp. a.c. motor, a d.c. exciter, and a control panel containing an ammeter with shunt and loads, a generator field rheostat, and the usual electrical control.

For bright nickel plating, a type RDR2 14x28 in., five baffle, International filter unit is used, and for the chromium solution an SC 14x28 in. five baffle, International filter is used. Two Duriron, No. 2-025 heat exchangers and two Duriron 1½x1 in. D3MB-6 centrifugal pumps are also part of the equipment.

A system for material handling has been built into the plant, consisting of a monorail system and a portable hand hoist. The mono-

rail system is lined up over the plating and rinse tanks in a manner that permits handling material in a closed circuit, and is capable of handling loads up to 4000 lb. over each plating tank.

In conjunction with the electro-plating unit, the plant has rather unusual laboratory facilities for electrolytic research and control. The laboratory is equipped with six small plating tanks with necessary electrical accessories, various machine tools for testing the physical qualities of metallic deposits, and chemical testing facilities. The laboratory plating tanks can be used for commercial plating small parts if necessary.

While this plating equipment is not unusual, it is indicative of the effort to obtain only that material and equipment which will be of definite service in the work of specification plating. Currently, Platex, Inc., is using nickel and chromium to plate new parts and worn parts to increase their resistance to wear and corrosion, and to build them up so that they may be put into service.

The transportation company of a large eastern city recently sent in some compressor armatures, 27 in. long and weighing 30 lb. each, and some motor shafts, 4 ft. 3 in. long and weighing 220 lb. each. The journals of these pieces were to be built up to a specified diameter to increase their wear resistance. The journals of the compressor armatures, which were new shafts, were 15/32 in. in diameter by 45/16 in. long and 1½ in. in diameter by

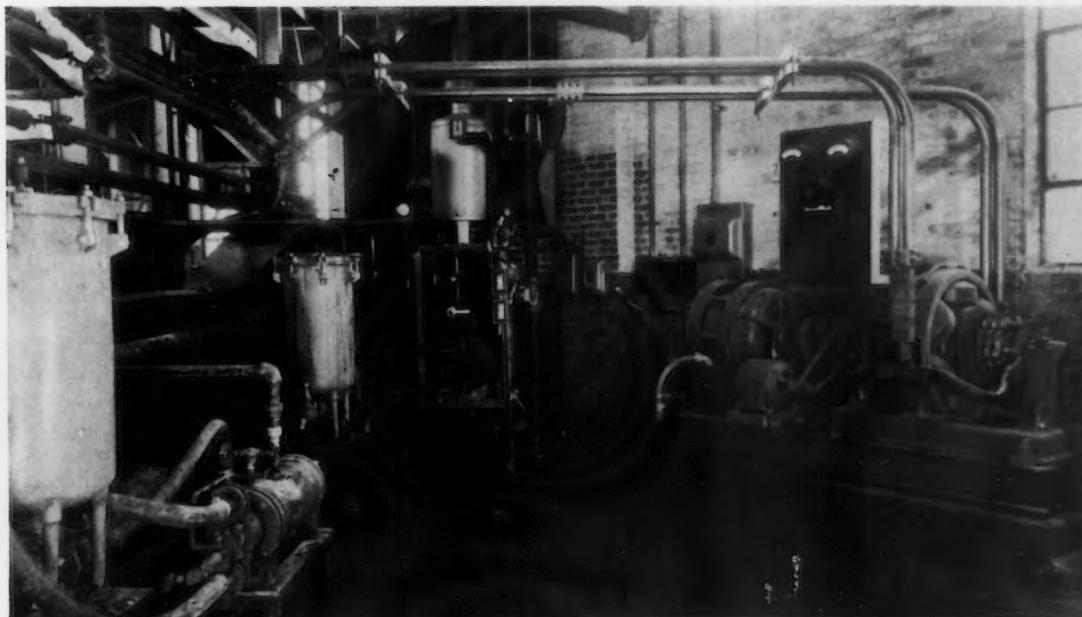
5 1/16 in. long. They were ground down to 0.005 in. undersize on the diameter, chromium plated 0.005 in. oversize, and reground. The motor shaft journals, 3 3/4 in. in diameter by 7 1/32 in. long, and 4 1/2 in. in diameter by 10 9/32 in. long, were handled in the same manner.

As a result of this plating, the journals are considerably more resistant to wear and corrosion, and the transportation company is contemplating having all new and old journals on compressor armatures, motor shafts, and car axles plated. The scrapping point for axles had been reached when they were 1/8 to 1/4 in. undersize, but such shafts may here be built up with nickel, finished with chromium, and reground to size, permitting them to be used long after they might have been discarded.

On new material where resistance to wear and corrosion is a big factor, similar plating work is being done. An assembly barrel believed to be part of a recoil mechanism on a machine gun was being chromium plated to increase wear resistance. The part was ground, before plating, to 3.089 in., plus 0.001 and minus 0.0000. After plating, the part, 1.109 in. wide, was exactly 3.091 in. in diameter, plus 0.000 and minus 0.001 in. The close tolerances on this diameter were achieved without grinding after plating. In one day Platex turned out 550 of these parts without a single reject.

Another part that Platex recently plated is shown in Fig. 3. Ma-

FIG. 2—The arrangement of the electrical equipment at Platex, Inc., New Rochelle, N. Y.



chimists at Federal Machine Tool Co., New York, drilled the hole shown in the part 0.002 in. too large, and were hoping to find that legendary machine shop aid, the "putting on" tool. PlateX took three of these misfit parts, and chromium plated the inside of the hole with exactly the 0.002 in. needed. By placing a thin platinum anode down through the hole and using a standard chromium plating bath with a 1 1/4-amp. load, the hole was built up to extremely close tolerances and the pieces saved from the junk box.

Similar illustrations of the adaptability for chromium and nickel plating for salvaging parts can be pointed out. In one instance, closely fitted parts of several airplane landing gears had been under-machined, and were built up by electroplating at a cost of about \$40 each. In the under-machined condition, the assemblies are completely useless, and the cost of the assemblies is about \$300 each.

Chromium plating, while very hard, is also brittle and has limited tensile strength. Consequently, on applications where high surface pressures are encountered, the basic metal must be sufficiently strong to support the chromium. Accordingly, chromium deposits are suitable for building up and coating machine parts. Also, with the frictional and surface properties of chromium being so unusual, chromium plated surfaces have little tendency to seize, gall or cold weld to another surface. This makes chromium plated surfaces extremely valuable on mechanical parts that come in contact with other metal

parts or where the plated surfaces are subjected to abrasive wear from metallic or non-metallic materials. Standard chromium plating solutions are used, and the bath load runs about 4 to 5 amp. to 1 sq. in. of surface to be plated.

PlateX has found nickel advantageous in some instances because it can be deposited at a higher current efficiency and is more economical. Also the use of nickel

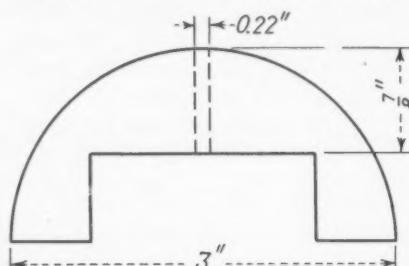


FIG. 3—The hole through the center of this part was drilled 0.002 in. too large, but the parts were recovered by chromium plating the necessary 0.002 in. inside the hole at a fraction of the cost of the original part.

makes it possible to vary the crystalline structure of the deposit, permitting a structure similar to that of the base metal. In effect, electrolytic nickel has the property of responding to chemical changes determined by the hydrogen ion concentration (pH) on the bath. Thus, depending upon the degree of bath acidity, the crystalline structure of the nickel electrolyzed will vary from large crystals, yielding a hard plated surface. When the bath acidity tends toward neutral, representing a pH of about 6.8, maximum hardness of the plate

is obtained, and varies to a soft, small crystallized coating, when the bath is highly acidic. The Brinell range from the two extremes in hardness will vary from a minimum of 160 to 180 to a maximum of 650 to 670.

Consequently, nickel is often used to build up a part within close tolerances of its finished size, and chromium is used to finish it. The nickel itself will withstand mechanical wear very well, can be readily machined with standard cutting tools, and has little tendency to chip or fracture. However, since the electrolytic potential of nickel coating baths is very much higher than in chromium baths and the cost of nickel and nickel salts compares favorably with chromium, the cost of building up operations in nickel is considerably less than in chromium.

To sum up the uses of nickel and chromium plating to specification, it may be generally stated that aside from routine specification jobs to definite thicknesses for protection against wear and corrosion, treatment with plated metals permits building up worn, over-machined, and under-machined parts, such as spline and cylindrical shafts, pistons, pump cylinders, crankshaft journals, and other machine parts; the building up or encasing of such articles as centrifugal pump shafts, torpedo propeller shafts, various parts of percussion and ejection mechanisms, plastic or rubber molds, and aircraft parts; and reclaiming such items as reamers, taps, gages, drawing dies, forming dies, and sundry other products.

Silver Electrical Contacts Excellent

SILVER has found the wide use for electrical contacts, partly because it ranks highest among all metals in electrical and heat conductivity; both highly important factors in making and breaking of electric circuits. In electrical contacts, current must be carried continuously without excessive heating and the contact usually must rapidly dissipate the heat caused by arcing if it is to continue to function as desired.

Metal oxides have high electrical resistivity and that of silver is no exception. However, silver does not oxidize readily, and when the oxide is formed, it decomposes at

around 572 deg. F., releasing the oxygen and becoming pure silver, an action which almost certainly occurs in arcing contacts. The sulphide that forms on silver when sulphur is present, causing silver to tarnish, is a good electrical conductor.

Pure silver is rather soft, is subject to mechanical wear, and sometimes to sticking where arcing occurs. Hence, silver is often alloyed with other metals when used for making electrical contacts. Hardness is increased by copper, of which 7.5 per cent is used in sterling silver and 10 per cent in

coin silver. These alloys make good contacts and have both high heat and electrical conductivity when properly heat treated. Other metals, including molybdenum and tungsten when mixed with silver by sintering, are often used where severe arcing is encountered, as in high inductive circuits. However, as they lower conductivity and increase contact resistance, high contact pressures are required. Lowered conductivity can be offset by using supplementary silver contacts which close after and open before those containing the refractory metals added for arc resistance.



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Photo by U. S.
Army Signal Corps



Assembly Line . . .

• **WPB reorganization aims to put toughest jobs up to industry itself for solution, Nelson says . . . Tightness of materials more apparent in recent weeks . . . Decisions already made on building new synthetic rubber industry.**



DETROIT—In no uncertain terms Donald M. Nelson in Detroit last Friday told industrial leaders that the problem of obtaining materials for war production was the one big one to be licked now.

"We are short of materials all along the line," he declared categorically.

There are some things that industry can do to help solve the shortages. In fact, Nelson said, he is going to put it up to industry to take the responsibility of eliminating shortages on its own initiative. On steel, copper, zinc, lumber—any material that is short—the problem is going to be submitted to the industry involved and Nelson is going to expect results, he declared.

"If there is any one criticism of the war effort," he said, "it is that we fail to use industry enough—to turn the problems over to the genius and skill of the industry instead of staying awake at night trying to think it out ourselves (in Washington)." Nelson's recent reorganization of WPB is on the basis that his staff and his organization will submit major problems to the industries involved, rather than trying to master-mind the situation within WPB, he said.

"I'm going to see to it that American industry has the respon-

sibility squarely on its shoulders as it should be," was Nelson's promise to an audience of 1,300 leaders of the automotive industry at the first annual meeting of the industry's Automotive Council for War Production. His declaration of policy brought resounding cheers from the high-powered audience of executives, and his concise statement of the difficulties ahead in materials supplies left the audience sobered with reflection.

THE tightness of supplies of materials has been more and more apparent in recent weeks and apparently predominates in the thinking behind many of the broad decisions that have been made in regard to production. Considerations of shipping difficulties and strategic reasons have paralleled the shortage situation in importance, apparently.

General Motors Corp. put itself on record publicly during the week as blaming a steel shortage for a reduction of production schedules at the Yellow Truck and Coach Manufacturing Co. in Pontiac.

Roger J. Emmert, vice-president and factory manager, announced that because of a steel shortage there was a lack of axles normally supplied in part by GM's Chevrolet Gear and Axle Division in Detroit. He explained that he was making the announcement because "management is frequently criticized for not making public its reasons for production changes." He declared that Chevrolet was forced to suspend production on July 2 and that Yellow Truck received its last shipment on July 6. Because of censorship he could not disclose the extent of the Yellow Truck shut-down.

Fairly obscured by restrictions on publication are the causes for a sharp slowing in tank production but the reasons given, each of which has at least some validity, include the materials situation, the shipping situation, a desire to divert materials to other products until the tanks are needed for strategic purposes, and model change-over. Lest the reader infer that the tank situation is in a bad way, it can be stated that this is not true. No one intimate with the situation is at all concerned, nor have the schedules actually been slashed in such a way that the

enemy can take any comfort from the fact. In other words, the present pace is being hit as scheduled, not just by happenstance.

Senatorial prerogative has already been employed to give the nation some information about oddities in the airplane program that are attributed to tightness in aluminum supplies, especially forgings.

THE amount of aluminum required even in the initial stages of a large-scale program for production of airplanes is astonishing even to experienced industrialists, when they begin to check up. For example, take Ford's Willow Run bomber plant. The Army has publicized the fact that the plant is in production. Well, what lies between production of aircraft parts and the time when a giant assembly line rolls rhythmically 24 hrs. a day and seven days a week? It's good mental stimulation to take some approximate figures and piece them together.

As a general starting point, take into account that bomber fuselages placed end to end on a mile long assembly line would require about 50 units to fill the line. Most of the projected plants, and a few of the existing plants, have two parallel lines, requiring about 100 bombers in process at one time.

In other words, before the assembly lines could begin to move, it would be necessary to have at least a hundred sets of parts made up—the equivalent of nearly \$25,000,000 worth of completed bombers.

Even following the practice of starting one line first, and feeding the other afterward, the initial requirement would call for parts equivalent to \$12,000,000 worth of completed airplanes.

But that's just the initial requirement. Obviously there isn't a press or a machine for each operation and for each part. Machines many times run alternate jobs. It is necessary to run parts production in cycles, building up a bank of parts and a float to carry from one cycle to the next. That means that the initial bank of parts must be enough to fill the line and keep the line flowing until the parts production cycle begins to repeat. That steps up the \$12,000,000 figure considerably, the exact amount de-

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ON THE ASSEMBLY LINE

pending upon the production equipment available, the operating cycle in the plant, availability of materials, and the variations introduced by various experts involved in scheduling and synchronizing production and assembly operations.

These individual variations can be big ones. For instance, automobile parts plants sometimes operate on a 10-day cycle, other times on 20- or 30-day cycles, or even 60 days, six months or approximate annual cycles. If a cycle is changed from 10 days to 20 days, the required bank of parts is approximately doubled.

THESE considerations support the opinion that a major bombing plane plant might easily require delivery and fabrication of aluminum and other materials in quantities great enough to turn out upwards of \$20,000,000 or \$30,000,000

worth of planes, even before the assembly line conveyor moves.

But when such a line moves, the hours begin to shrink and the volume, it can be guaranteed, is in the realm of the fantastic.

"Sound, but Lean"

On one scale or another every industry has its parallels. And every industry has to reach decisions that may, like the above reference to 10- and 20-day operating cycles, mean a doubling or a tripling of requirements for material in process or in inventory. It must have been considerations like this that moved Donald Nelson, no rhetorician but a practical man, to say that industry must "do more and more with less and less" and to urge the top-most executives of the industry to "go through your plants and processes and see if you are wasting materials... Our only limit

to production is the big unlicked problem of waste of material... Through the leadership of men like you here, we can do more than anything else to solve the materials problem... We've got to have a lean economy—sound, but lean."

Nelson put himself on record in a most emphatic way about the rubber situation. He reiterated an acknowledgment that our national economy is built to run on automobile tires, and must be kept running. He asserted that he knew his course well and would not be moved from it. Our greatest industrial task ahead, he said, is to build a great new synthetic rubber industry.

There is no confusion over this, but there are many who want it to appear confused, he declared.

The necessary plants are underway and "our decision has been made," he asserted.

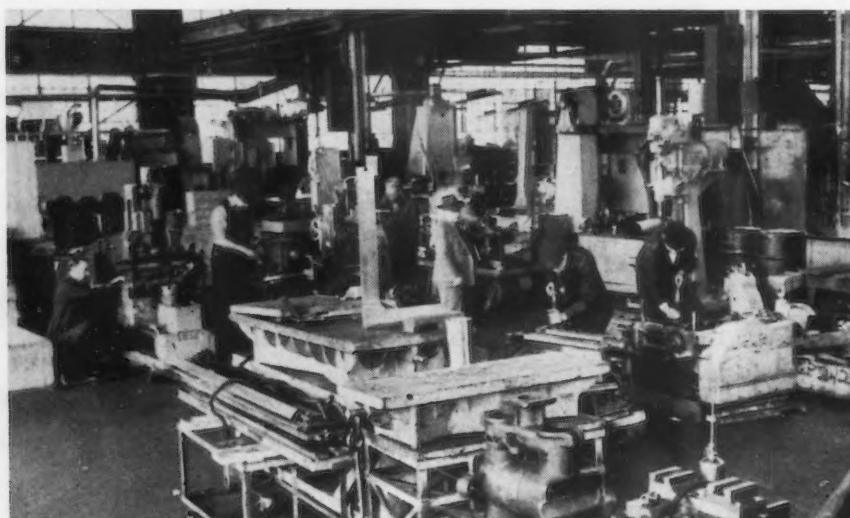
"If it's wrong I'll take the blame," was Nelson's final four-square statement.

That simple statement brought a round of applause that might well be taken as a fair sampling of opinion in America which wants only to know that vacillating on such critical national questions is at an end.

THE ACWP at its business sessions heard Robert F. Black, president of White Motor Co., and a vice-president of ACWP, announce that a new impetus to rapid exchange of technical facts and ideas is to be given through inauguration of a published service called "Production Information" for the benefit of the industry. It will represent a tapping of every avenue of technical facts and ideas on production methods, equipment, materials and on short cuts to greater volume and lessened time requirements.

ACWP also heard Ernest Kanzler, czar of the industry and WPB chief in the Detroit region, compliment the industry on its cooperation, and its success in throwing aside traditional ideas of competition. This aggregation of automotive companies and suppliers, he said, might well be called "Automobile Builders' Combination Designed Especially for Getting Hitler, Including Japan."—the "ABC-DEFGHIJ" of wartime mass-production.

KEEP 'EM RUNNING: More than 600 machine tools are being repaired at Pontiac Division of General Motors Corp. as a part of the re-tooling effort for diesel engine parts, guns, and other war materiel. About 115 men are kept busy scraping ways, fitting bearings, changing cams, slides, feeds, and doing other things to adapt the machines to war uses.



WOOLWORTH TOMMY-GUN: This new Sten gun, being issued to the British Army and the Home Guards, is being produced so economically and rapidly that it is known as the Woolworth Tommy-Gun. By mass production methods, the cost of this gun is about \$8.

Acme Photo





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Washington . . .

• Nelson snatches the ball and runs with it, showing by his "realignment" move that he knows how to act in the "legal twilight" which engulfs the acts of bureau heads.



WASHINGTON — Donald M. Nelson, WPB's portly chairman, last week during his announcement of the "realignment," not "reorganization," of the war agency "led a revolution." He told the Army and Navy that he still retained the powers granted to him by the President in setting up WPB, and that certain duplicating functions of the Army and Navy Munitions Board would be merged in WPB.

Furthermore, Mr. Nelson demonstrated that he understands how to negotiate in the "legal twilight" which engulfs the acts of bureau heads where the only practical antidotes to wrongful official action are a Presidential spanking, or snatching the ball and running with it. Mr. Nelson chose the latter course.

The ANMB, established in 1921, to purchase and settle specification, jurisdictional and other disputes between the armed services, was given priorities powers by the WPB chief during March. The same order validated all preference ratings, etc., which the board had issued up to that time. The future actions of ANMB were to be concurred in by the WPB Director of Industry Operations.

For more than a year, ANMB had an organization which is a fair duplication of WPB. Its ac-

tions in granting preference ratings, and securing materials, including those of the Maritime Commission, and the War Department Services of Supply, as well as those of the Navy Bureau of Supply and Accounts had contributed no little to the "priority inflation" discussed in this column in the past six months. Notwithstanding WPB's power on paper the Armed Services were the signalmen who did the wigwagging.

A centralization of material and production control has long been pointed to, if there were any excuse for WPB's existence. Mr. Nelson had been told of the bypassing going on in front of his nose by his advisers, but he was loath to believe.

Dr. Luther Gulick and Mr. Nelson sought to resolve this damaging friction by offering Ferdinand Eberstadt, ANMB's operating head, the job of Director General for Operations in the new WPB organization. For a time it was thought that Mr. Nelson and his aides would be successful.

However, something slipped, and Mr. Eberstadt did not take the job. Indications are at present, that with material allocations controlled by WPB, and Mr. Nelson's determination to do the job he was hired for indicate a WPB triumph for the present at least. However, the White House may be prevailed upon at some future time to tilt the victory in favor of the Armed services.

NOT all grounds for criticism are in favor of WPB. One Naval aide said recently that WPB's very great lack of technical knowledge was a needless slowing point in the war effort. Several instances were cited where WPB paperwork requirements predicated on the lack of industrial knowledge had blocked material supply until the Navy could educate the erring WPB officials.

One major virtue in the current WPB reorganization, according to Mr. Nelson, is that it is designed to prevent jurisdictional overlapping. WPB has up to now been peppered with conflicting policies held by the heads of the various divisions so that WPB action in the past has been subject to much internal conflict.

The resulting straight line or-



Harris & Ewing Photo

WPB INDUSTRIES BRANCH
CHIEF: Philip D. Reed, chief of the WPB War Industries Branch, appearing before the House Small Business Committee estimated that 24,000 small manufacturers will be forced to close up shop before Oct. 1, because they are unable to participate in war production and unable to obtain materials for non-essential civilian products.

ganization from the chairman through the Director of Industry Operations, Amory Houghton, is aimed to still these conflicts.

William L. Batt, former director of the Requirements Committee was named as vice chairman to take over the organizational functions formerly held by the chairman. Donald Nelson will be freed by this move to visit allied war establishments and domestic factories as

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WASHINGTON NEWS

well and to act in purely an "umpire" capacity between the Armed services.

MR. NELSON told THE IRON AGE that the "realignment" most nearly followed the War Industries Board of World War 1, set up by Bernard M. Baruch, than any other organizational changes recommended.

"Indeed," said Mr. Nelson, "I have long been a great admirer of Mr. Baruch and one of his disciples."

J. S. Knowlson, president of Stewart Warner Corp., and former director of industry operations, has been made vice chairman in charge of program determination. Mr. Knowlson also acts as Mr. Nelson's deputy on the Combined Production and Resources Board between Great Britain and the United States. The Requirements Committee whose job it is to parcel out materials according to the supply and demand of both the military and essential civilian factions, also reports to Mr. Knowlson.

On the same organizational level as Mr. Knowlson are the heads of the Small War Plants Corp. and Program Progress. Neither of these two deputy chairman's names

has been announced. Mr. Knowlson has the authority to channel materials on a sort of a crude allocation basis, and the WPB functions with respect to purchases have been given him.

AMORY HOUGHTON, chairman of the board of Corning Glass Works, Corning, N. Y., has the responsibility for materials, production, the former division of Industry Operations, with its power over priorities and allocations. The Bureau of Industrial Conservation and the regional offices will also report to Mr. Houghton. The Inventory Control Division, and the Division of Industry Advisory Committees both come under the Director General for Operations.

The staff functions of Civilian Supply, Planning Committee, Statistics Division, Legal Division, Administrative Division, and the Labor Division remain to the greatest extent unchanged.

Mr. Nelson divided the new organization in half and stated that everything above the Director General of Operations was a policy level and that everything below was the operating function.

The Program Progress Deputy Chairman is to work with the op-

erating units of WPB, with the Supply Arms and Services to which WPB has delegated procurement, production and expediting responsibility. Part of his duties are to work with the WPB's Planning, Statistics, and other staff divisions to follow program progress, to anticipate bottlenecks, to detect causes of failure when failure occurs, and to help to see that necessary steps are taken.

WORKING with the vice chairman on Program Determination will be the procurement policy division, formerly the Division of Purchases, under Holder Hudgins, and a new Construction Program Division, which will be responsible for considering and programming all plans for capital expansion, whether military or otherwise, and making sure that facilities are in accord with the maximum overall program.

In speaking about ANMB's duplication powers, Mr. Nelson said that the WPB Machine Tool Branch would control major policy in distributing of tools—the ANMB merely determining the relative urgency.

WPB claims that one of the most important parts of the new structure is the fact that it gives WPB a closer relationship to the broad strategic picture, and a closer relationship with the other governmental agencies which have responsibility for various parts of the war program.

As to strategy—the tie-up between WPB and the Combined Production and Resources Board with Mr. Knowlson as Deputy Chairman, is made close and effective. The work done by the Combined Production and Resources Board can be woven into the operations of WPB in such a way that decisions made by the Combined Board can be translated speedily into programs and action by WPB, and also that the "potentialities of the American economy" can be understood by the Combined Board and woven into its decisions.

The whole job of WPB contacts with other agencies are through the War Production General Staff. On it will be representatives of BEW, OLL, RFC, ODT, Manpower Commission, Army Air Corp, War Department, Services of Supply Treasury, Procurement Division.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



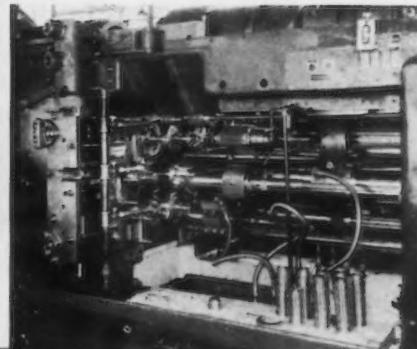


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WEST COAST . . .

• Wrong sequence of steel deliveries threatens production at large Coast shipyard...Wage increase totaling \$125 million asked of aircraft industry by CIO - AFL combination...New giant plane has only two engines.



SAN FRANCISCO — Tush-tush talk to the effect that plenty of plates and shapes for shipbuilding are just around the corner seems incredulous in Southern California where production and morale of one of the nation's largest shipyards is seriously threatened because of shortages.

This shipyard has been building standardized Maritime Commission EC-2's for more than a year. Delivery sequence of required steel is well known, yet unless certain structural steel and plates are received within a few days, hulls now on the ways will not be launched on schedule.

As well as being one of the largest, the yard affected probably is unsurpassed in the speed with which it constructs emergency cargo vessels. Labor morale has been good and management extremely efficient. Apparent inability of mills to properly schedule rollings or faulty shipment scheduling, after more than a year, has created local unrest which threatens to burst out on the floor of Congress as a national scandal. Vocal visions of plenty echoing from the nation's capitol are merely adding fuel to the flame.

The shortage of required steel involves shapes as well as plates, which is difficult to explain. Inventories of this yard would show a substantial steel tonnage on hand, but not of needed types, indicating that the difficulty lies in improper sequence of delivery.

Efforts of the Maritime Commission to ease the situation have brought encouragement to the yard management and relief is hopefully expected. If none comes, Reese Taylor, chief of the WPB steel branch and former Los Angeles steel fabricator, is likely to find a tempest right in his old stamping grounds, stirred up not by management but by organized labor.

THE Los Angeles AFL Metal Trades Council, whose member unions hold contracts at the yard affected, already has wired California Congressmen to investigate the bottlenecks that are holding up delivery. Similar action was taken by the Los Angeles Central Labor Council. Reassuring replies from the Congressmen have not been acceptable, the labor organizations have indicated. The unions claim, probably correctly, that unless steel is rapidly forthcoming from 15,000 to 20,000 men may be laid off.

"It would be two or three months before the demoralization that such a layoff would cause could be corrected and the yards again operating on a smooth basis, which would be a calamity," a communication of the Central Labor Council declares.

The dynamite with which the situation is charged lies not so much in the shortage, itself, as the fact that the labor press is inclined to treat the difficulty as a plot on the part of Eastern mills to favor mill-controlled shipyards and to punish the Henry J. Kaiser interests for undertaking construction of an independent West Coast steel mill. Remember, this agitation is not an off-shoot of criticism of the industry by CIO President Phillip Murray, but has its grass roots in the AFL rank and file. If the shortage becomes more stringent, and a large-scale labor lay-off ensues, the AFL will probably demand that Navy steel inventories also be investigated.

The Aircraft Industry Labor Stabilization Conference during its first week of closed session produced nothing sufficiently concrete as to indicate what final agreement might result.

The statements by the participants, however, furnished hints as to how issues were shaping up.

Appearance at the conference of representatives of the OPA voicing

their determination to put the air frames industry under price ceilings with a warning that present profit margins were regarded as ample to take care of wage raises threw a cloud over hopes that increased labor rates could be passed along, and possibly over the entire success of the stabilization conference.

Both AFL and CIO representatives showed the same unity which has been visible in southern California labor programs for some time, at least insofar as the aircraft industry is concerned. Demands for wage increases embodied a scale agreed upon by both these major labor organizations, and included increases of more than 50 per cent in the unskilled bracket. Unskilled beginners, who now start at 60c. an hour and are stepped up to 75c. an hour over a three-months' period, would receive a 95c. minimum. The semi-skilled group would receive from 95c. to \$1.35, and skilled workers from \$1.35 to \$1.60. The raise asked in this top bracket is less than in the others, for most skilled workers are now receiving \$1.52.

BESIDES agreeing on the wage proposals, the joint AFL-CIO front posed the following platiutes:

"1. That there should be discussion and recommendation for a comprehensive training program that will provide initiative and security for new workers in aircraft.

"2. That all aircraft workers should stay on their jobs in the plants and await the results of the conference, to which all labor looks for relief from substandard wages.

"3. That a thorough study of the application of the proposed rates of pay should and must be made as they concern job classifications.

"4. That there shall be no strikes or slowdowns in aircraft.

"5. That no worker should get a reduction in pay as a result of the signing of an agreement at the conference.

"6. That there should be established in all plants joint labor-management production drive committees as suggested by the WPB."

The two unions also agreed that the conference should set a retroactive date for any wage increases agreed upon. The CIO suggested

WHAT'S THE ANSWER?

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MORE PRODUCTION!

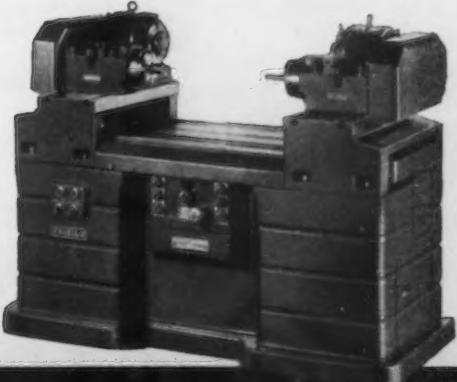
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BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

NEWS OF THE WEST COAST

July 6, but the AFL named no date. If this conference is to be the forerunner of others in the East and Midwest—and the WPB says it will be—the matter of setting the retroactive date for wage increases has real importance. If the AFL-CIO can wangle the wages it asks, the boost would amount to about 125 million dollars annually on the Pacific Coast alone. Nationally, from 1,250,000 to 1,500,000 persons are or will be employed in the aircraft industry and would be affected by agreements reached at this conference if it is to be a pattern.

The CIO conferees are sticking by their original contention that when the conference brings Pacific Coast wages up to those paid aircraft workers in the automotive centers, this scale should serve as a nation-wide pattern. Thus, they argue, intersectional labor migration would be reduced to a minimum. The AFL has taken no strong stand on this matter, probably for the reason that if intersectional stabilization were carried into other fields, high rates paid skilled AFL members in some union strongholds would probably have to be leveled off. Such a worry does not confront the CIO which, comparatively, draws most of its strength in less skilled labor categories. Manage-

ment conferees, representing only the nine major Pacific Coast aircraft plants, naturally are interested only in the scale which is set for this area. Their chief "stabilization" worry has been to prevent workers from drifting to the better paying shipyard crafts.

FIRST item on the agenda was the establishment of job classification and revaluation. This item is expected to bring out heated discussion, because of fluid classifications in the various plants resulting from the comparative newness of the industry.

With labor representing from 40 to 50 per cent of the cost of constructing aircraft in the assembly stages, the critical relationship between wage decisions of the conference and an OPA price ceiling for the industry is evident. The presence of OPA representatives at the conference should serve to lessen the possibility for conflict with any price ceiling that might be imposed, however.

In the plant construction field, shipment of materials and machinery in advance of actual need in order to take advantage of present availability of rail transportation is evident. A portion of the structural steel and equipment for a

huge Pacific Northwest metal plant has arrived and is being stored while foundations are constructed.

First unit of a plant to produce sponge iron with domestic ores will be complete within three weeks, the Electro Thermic Reduction Co. declares. Utilizing Bonneville power, the first five ton unit of the plant, which is located on the Columbia River in Oregon, will obtain ores from Oregon deposits. Actual operation of this plant would be a blessing to the industry which has been busy battling off allegations that sponge iron would be a remedy for all Pacific Coast steel making problems. With Secretary of the Interior Harold Ickes in the vanguard of sponge iron advocates, actual production cost figures in this plant may heavily modify future policy.

EXPANDING shipbuilding activities in the Portland area will require 107,000 more men by the end of this year, the United States Employment Service estimated last week. Chief employer will be the rapidly growing yards controlled by the Kaiser interests.

Announcement was made by the Navy of the test flight at Seattle of a new Boeing twin-motored flying boat described as able to carry a larger bomb load than any Naval plane now in use. Designated as the XPBB-1, the new plane embodies the results of other experimental models. Notable in this field are those now constructed on a large scale by Consolidated Aircraft Corp. and their experimental predecessors. The craft is unusual in that its substantial power comes from two engines rather than four usually powering planes of this size. This concentration of power, although involving more intricate engine design, allows simplification of construction of the craft itself.

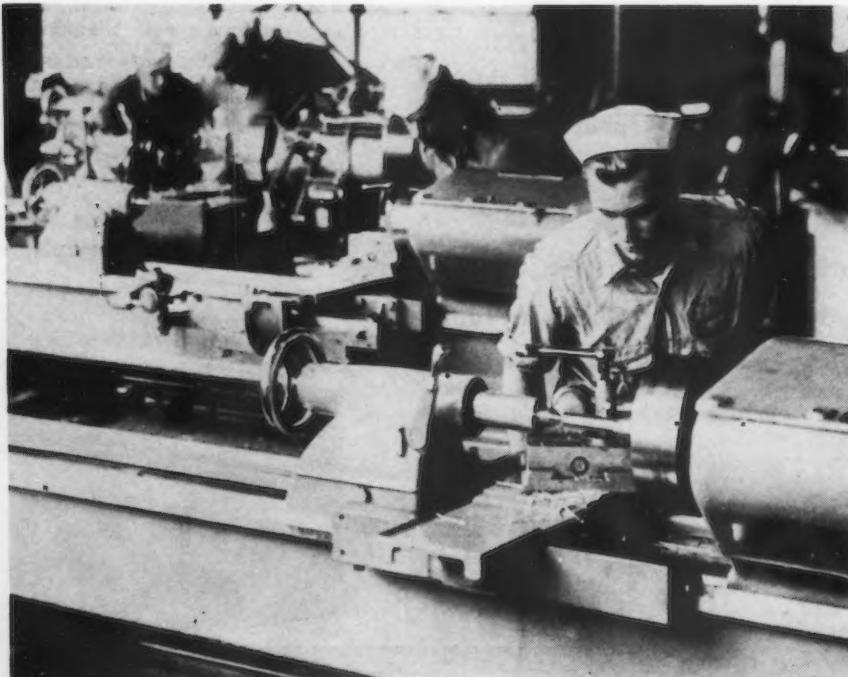
Ruling on Imported Rolls Upheld by Appeals Court

Washington

• • • In a decision announced on Monday, the United States Court of Customs and Patent Appeals upheld the United States Customs Court which assessed imported steel rolls used in rolling mills for cold rolling steel at 30 per cent as parts of machine tools. Alex Benecke, the importer, had protested that the rolls were properly dutiable at 27½ per cent as parts of machines.

SAILORS IN IRELAND: American sailors, machinists' mates, are at work in this shore machine shop at the American Naval Base in Northern Ireland. Navy units have set up a complete base, and a strong armed force of the U. S. Army is already encamped.

Acme Photo



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Fatigue Cracks

BY A. H. DIX

Plea for Help

• • • Mr. Spink, of Spink & Gabore, Inc., called us up the other day and told us that our print shop failed to deliver ten copies of the Mar. 5 issue. Spink & Gabore is your favorite family journal's official binder—six months' copies in one volume, buckram \$3.50, half morocco \$5.25. You furnish the copies and pay the freight.

As we hadn't a single copy of the Mar. 5 issue on our shelves we asked the staff to rummage through cellars, attics and library tables, but the net haul so far is only three copies. If we can't get seven more we will be in a h. of a f. If you could spare your copy we would be no end grateful.

There Is a Destiny . . .

• • • Spink & Gabore is not something we made up. It is the name of a real firm, and to us it is no less perfect than Gray's *Elegy*, the Taj Mahal, a Vargas girl, the Kohinoor, Artie Shaw's rendering of *Begin the Beguine*, or the first two rum Collins.

We often shudder at what might have been. Mr. Spink might have gone into business with someone having a name with a low co-efficient of friction, like Sullivan, for example. Mr. Gabore might have teamed up with a man having a name with no bite to it, say Gerard, for instance. It was fate that brought Mr. Spink and Mr. Gabore together, to create the perfect corporate cognominal abrasive.

Let Their Light Shine

• • • This is not to be construed as a plug for Spink & Gabore. We are not among those who are impressed by bound volumes that go 'way back to the burnt leather cushion era. Rather than embalming copies in buckram or morocco, it is far better that they be allowed to wear themselves out usefully by being made available to the men in the plant.

If your bifocals are strong enough you will see your favorite family journal in top center position on the magazine rack in the unnamed Coast aircraft plant pictured in the July 4 *Saturday Evening Post*'s swell story by George Bijur on night work. And Fred C. Dull of the Monarch Machine Tool Co. has been good enough to send us this illustration of a magazine station in the Monarch plant.

We doubt that every one of your employees has his mouth constantly agape to receive the steady stream of production tonic our brains department and advertisers squirt in your direction. But some are blessed with an intellectual thirst, and as the process of slaking that thirst frequently produces jackpot ideas, we are all for the shop library.

Slogan with Superfinish

• • • Last January Ambrose Harle coined the slogan, "The man who relaxes is helping the Axis." We complained about it at the time, remarking that unrelieved tension produces stomach ulcers, and suggesting, "The man who is lax is helping the Axis."

J. G. Hawley of the Hawley Brake Co. then took a



crack at it, cutting out an "is," and emerging with "He who lax is helps the Axis." We said we thought the change was for the worse, because of what we regard as clumsy construction. But now Carl D. Anthony, editor of the Continental Screw Co.'s shop paper, "The Continental," says he not only heartily agrees with Mr. Hawley but used the slogan in that form in the June 3 issue of his paper.

On second reading, it doesn't sound bad at all. It sort of grows on us and we might learn to love it. Continental Screw Co. is an advertiser.

Out-Byrane

• • • Our own invention, "He who lapses helps the Japses," is topped by Alexander (Eisemann Industrial Corp.) Eisemann with "Each job that's finer is help to Chiner," and "Permit no skips; it helps the Nips." Mr. Eisemann has also indited a four-liner, "To the American Workman:"

His wonderful works
Give Hitler the jerks.
Each wallop he packs is
A jolt for the Axis.

He even has something for cynics like "Deac" who doubt that slogans will help win the war. This is it:

There are phrases to fight 'em
Yes ad infinitum.
But we want production,
Not verbal seduction.

Truancy Deterrent

• • • We see by last week's edition of your favorite family journal that the patriotic slogans don't seem to be helping much in fighting absenteeism among those on a seven-day schedule. We suggest a trial be given Franklin P. Adams' immortal, "All work and no play makes jack."

Apronym

The A.S.M. Metals Handbook, 1939 edition, page 129, has an article entitled, "Hardness Testing at Elevated Temperatures." Dr. Oscar E. Harder wrote it.

Stoppers

• • • Victory will be measured in gallons—Koppers Co. Jim Eaton's speedboat is out hunting Japs—Revere Copper & Brass, Inc.

Bargee Explained

• • • Miss Selma Boyle, J. M. (Leeds & Northrup) Plummer, Mr. Weick and others inform us that a bargee is simply an Englishman who works on a barge. Oddly, the word is pronounced with the accent on the second syllable, and not as a singer with a head cold articulates "My Little Margie."

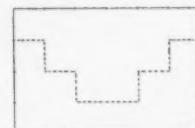
Puzzles

• • • Last week's cars traveled at these speeds: A, 150 m.p.h.; B, 140 m.p.h., and C, 160 m.p.h. The course was 350 miles long.

Lt. Com. L. H. Burkhead of the Puget Sound Navy Yard, whose name is within one letter of being aptronymic, writes that he has an improvement on the June 18 problem—the one about arranging twenty 1-ft. boards so that the area enclosed could be doubled with two additional boards. He arranged his twenty boards like this, making an enclosure of 12 sq. ft. By rearranging in 4 ft. by 6 ft. form he doubled the space with no additional boards.

This one, by A. C. Wilcox, should take you less than 10 minutes:

An army marches in a column 21 miles long, and travels 28 miles in a day. At the beginning of the march, a messenger on horseback starts at the rear of the column and rides to the front, delivers his message at the head of the column and returns at the same speed, reaching the rear just as the army ends its day's march. How far did he ride?





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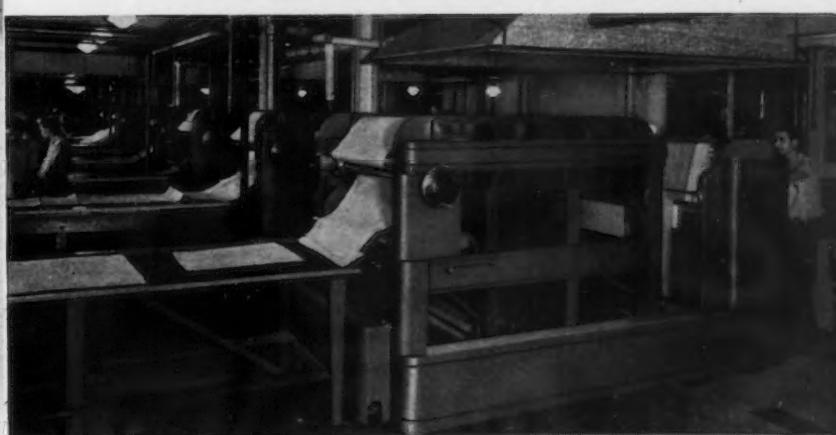
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This gigantic task calls for 3 eight hour shifts, running a battery of 26 streamlined Pease Model "22" Continuous Blueprinting, Washing, Developing and Drying Machines, without interruption, 24 hours a day, month in and month out . . . unquestionably proving the value of Pease advanced design, rugged, trouble-free construction and outstanding, exclusive features . . . a combination which is making this quantity production of quality prints at low cost an every day occurrence.

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- ★ Sliding "Vacuum-like" Contact smooths out tracings.
- ★ Three Speed Lamp Control accommodates all types of tracings without change of running speed.
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furnished by the
U. S. Army Air Forces

Actual photograph of Pease Model "22" Continuous Blueprinting, Washing, Developing and Drying Machines installed at the Air Forces, Materiel Center.

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Dear Editor:

PRECISION CASTINGS

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NEW METHOD CASTING COMPANY
FIRST ARTICLE JULY 9 ISSUE
ELLIOTT CO. MCDERMET

- New Method Casting Co., 12 W. 21st St., New York.—Ed.

HIGH SPEED STEEL TIPS

Sir:

It has been brought to our attention that an article in your Apr. 16 issue, entitled "High Speed Steel Tips Cemented to Low Alloy Shanks," has considerable merit and may be a means of saving high speed steel. Could we get two or three copies?

C. N. HUBBARD,
Supervisor Small Tools

IRON ORE

Sir:

It was with much interest that we read Mr. Corrado's article, "How Much Iron Ore?" in your June 25 issue. The author is to be congratulated on the thorough manner in which he has covered this timely subject.

Can we obtain ten additional copies?

W. E. FREMONT,
Minnesota Power & Light Co.,
Duluth

Sir:

Your June 25 issue carries an article entitled, "How Much Iron Ore?" by B. W. Corrado, your Cleveland editor. It would be appreciated if you would furnish this office with at least three copies of this article.

MAJOR E. T. BUTLER,
Service of Supply,
War Department,
Washington

SILVER COATING

Sir:

In your issue of June 11 you have an article regarding Silver Coating. We would appreciate it if you would advise us as to whom we could contact to get more information regarding this.

J. ECKER,
Ecker-Erhardt Co., Inc.,
Chicago

Sir:

We wish to refer to a short article which appears on page 70 of the June 11 issue entitled, "Silver Coatings by Vapor Condensation." We would like to know all about the process, and we wonder if the author of the article could not refer us to some source from which we could gather more complete information.

T. SENDZIMIR,
Vice-President,
Armzen Co.,
Middletown, Ohio

- Additional information on silver coating may be obtained from Handy & Harman, 82 Fulton Street, New York.—Ed.

FITTINGS

Sir:

Could you advise us by return air mail who makes the Zerk fitting?

N. K. LEEPER,
President,
Cotton Chopper Co.,
Dallas, Texas

- Zerk was taken over by Alemite Div. of Stewart-Warner Corp., 1826 Diversey Parkway, Chicago.

FURNACE BRAZING

Sir:

May we obtain a reprint of the article on Brazing of Steel with Copper authored by G-E?

R. M. THOMAS,
Rheem Manufacturing Co.,
Sparrows Point, Md.

- You probably refer to the series of articles on electric furnace brazing by H. M. Webber, of General Electric Co. The series began in the Sept. 8, 1938, issue and ran until Mar. 16, 1939. The series was reprinted in a 50-page booklet and we believe that General Electric Co., Schenectady, can still furnish copies.—Ed.

TOOL STEEL

Sir:

Will you kindly let us know the analysis and nature of the tool steel known as "Colosso"?

C. A. ALEXANDER,
J. M. Alexander & Co.,
Atlanta

- "Colosso" is a water hardening steel containing C 0.30, Cr 0.30, Ni 0.50, Mn 0.65, V 0.10, W 0.30, Mo 0.60, and Si 0.65. The supply source is Hidalgo Steel Co., 74 Varick Street, New York. For data on uses, analyses, and supply sources of Tool Steels, see the 67-page, pocket-size Tool Steel Directory issued by The Iron Age, price 25c.

EDITORIAL REPRINT

Sir:

I would like to purchase the booklet containing reprints of 30 editorials by J. H. Van Deventer, mentioned in the attached clipping from your May 22, 1941, issue.

CHESTER F. PENNY,
Bridgeport, Conn.

- This booklet is now out of print. We are planning to publish a new edition early next month.—Ed.

AIRCRAFT STEELS

Sir:

I would like to get a copy of the issue of Feb. 19, 1942, containing the

article on Government specifications for aircraft stainless steel and aircraft carbon and alloy steel.

MANUEL MUSACHIO,
Lemoore, Cal.

DIE CASTINGS

Sir:

We have read with great interest the article, "War Applications of Aluminum Die Castings" by Herbert Chase in the March 26 issue.

We are very much impressed with this article and feel that if it were brought to the notice of British diecasters, it would be of assistance to the war effort of our united countries.

Since, under present shipping facilities, we cannot purchase from you a bulk number of the issue, we are asking permission to distribute 25 photostat copies to British firms engaged on diecasting.

R. R. CAIZBY,
Enfield Rolling Mills Limited,
Middlesex, England

- Permission Granted.—Ed.

PRIORITIES GUIDE

Sir:

The Liaison and Research Section of the Machinery Branch of the Office of Price Administration has found THE IRON AGE Priorities Section very useful. The information contained in this publication is pertinent to the work of the Machinery Branch, and we would like to request 15 copies, so that each Section of the Machinery Branch could have its own copy for reference.

W. A. NEISWANGER,
Office of Price Administration,
Washington

Sir:

We have found your priority section of immeasurable help to us as a means of quick reference.

If you are planning to continue this publication, would you kindly mail us two copies of your latest edition, as soon as this is available.

RALPH D. BERRY,
Davol Rubber Co.,
Providence

- We have been issuing the Priority Guide about every two months. The latest edition (the sixth) was issued as a section of the June 4 issue.—Ed.

DRAFT DEFERMENT

Sir:

Is it possible to get about 25 copies of the editorial in the June 11 issue entitled "Robbing Peter, Cheating Paul"? We want to use this in connection with draft boards who do not seem to realize the importance of as little disturbance to the operating personnel of war plants as should be the case. They are told, and individuals on the boards do see it, but it is difficult to drive the situation home so that it sticks.

S. L. GABEL,
Superior Tube Co.,
Norristown, Pa.

BLACKMER PUMP CO.

- CUTS 16 MAN HOURS FROM DAILY CLEANING TIME
- INCREASES MILLING CUTTER LIFE 300%

by **WHEELABRATING**

A YEAR ago the Blackmer Pump Co., Grand Rapids, Michigan, installed a 36" x 42" WHEELABRATOR Tumblast for cleaning pump and automotive castings, weighing from 1 to 65 pounds each.

Mr. J. W. Livingston, Foundry Supt., says: "The WHEELABRATOR not only turns out a better job of cleaning and gives a better appearance, but it does the job three times as fast as our old sand blast method. It has also reduced the number employed in the cleaning room from three, and sometimes four men, to a single operator.

"Tool life is another factor that has been improved on many jobs. With the old method the castings were not sufficiently cleaned, with the consequence that milling cutters lasted for only 400 to 500 jobs, whereas now, after Wheelabrating, the cutters turn out in excess of 1500 jobs before replacement is necessary.

"I know from experience that we simply couldn't get out the present volume of work and have the excellent appearance that our work now has unless we had this WHEELABRATOR."



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WHEELABRATING BRINGS YOU THESE ADVANTAGES

1. High-Speed Cleaning—reduces costs; speeds up shipment of orders.
2. Cuts Cleaning Costs up to 50% and more because: it is faster; saves power up to 80%; saves labor; saves time in loading and unloading; saves space, saves abrasive, saves on operating and maintenance costs.
3. Removes All Trace of Sand and Scale down to the virgin metal, with the result that:
 - Machining and grinding are faster.
 - Tools last longer.
 - Inspection is simplified.
 - Hardness readings are accurate.
4. Improved Appearance—Wheelabrated products are bright, silvery, and uniformly clean.
5. Provides Perfect Bond for final finishing such as enameling, plating, galvanizing, painting, etc.
6. Produces Wide Range of Finishes from fine to coarse.
7. Handles Wide Range of Work—from fine springs to heavy armor plate. Ideal for special and unusual applications.
8. Eliminates Chipped and Rounded Corners—only a minimum amount of stock need be allowed for finish machining.

This Industrial Week . . .

• • •

SOON the WPB Iron and Steel Branch will announce that all steel mill products are to be directed on a quota basis, THE IRON AGE is told. Each mill unit will be instructed to produce a specified tonnage of each product. For example, a 28-in. mill would be told to roll X-tonnages of structural steel, shell steel, bars and rails.

The new system, which aims toward product balance so that short items such as plates, structural steel, tubing and shell steel will be produced in adequate quantities, is being tested on a minor scale prior to application to the entire steel industry.

Meanwhile, manufacturers of metal products this week had been given another long list of civilian products which can no longer be made of steel because this metal is urgently needed for war implements of all kinds on an ever-rising scale.

250 Items on Latest List

The new list contains 250 items which escaped restriction in the original list of more than 400 items of which manufacture was prohibited by the War Production Board. Manufacture of some of the items on the new list has already been stopped by priority orders limiting deliveries of iron and steel to preference ratings of A-10 or higher.

Under the terms of a new amendment to Priorities Order M-126, manufacturers of items on Supplementary List A are given 30 days to process iron or steel for those purposes, with a limit of 75 per cent of the average monthly weight of all metals processed by him in 1941. Assembly of these articles is permitted for an additional 30 days.

Makers of civilian metal products find that a new list (C) has been added for Army, Navy and Maritime Commission orders which may be filled without restriction. List A restrictions do not apply to Army-Navy-Maritime Commission contracts until Aug. 4 and Supplementary List A restrictions until 60 days from the date of issuance.

Appeals under the iron and steel conservation order may be filed with the WPB field offices for the district in which the plant is located. A new appeals form PD-500 is being provided but PD-437 may be used until the new form is available. Handling of appeals has been transferred to a new appeals branch, Temporary Building E, Washington.

Plan New Steps For Small Plants

To small metalworking plants, not yet in war production, the new restrictions on iron and steel use give meaning to the line: "We have nerves that jingle, jangle, jingle."

Meanwhile new steps are being taken to help the smaller metal working plants whose usefulness in the war program has seemed questionable in the minds of some agencies at Washington. Donald M. Nelson, WPB chairman, has appointed a board of directors for the Smaller War Plants Corp., under the leadership of Lou E. Holland (Double Rotary Sprinklet Corp., Kansas City). Operations of the corporation will, according to Mr. Nelson, be along these lines:

1—To confine manufacture of

relatively simple war items to the smaller factories, using facilities of large plants exclusively to make those complicated and difficult items which cannot be made in the small plants.

2—By a very great extension of subcontracting, both through the use of pools and through much greater emphasis on farming-out of manufacture of bits and pieces by large corporations which hold prime contracts.

3—By conversion of small plants to essential civil production. (In our war program, Nelson said, we cannot make a sharp distinction between military and civilian production; the distinction rather is between goods which must be produced in a total war economy and goods which such an economy can get along without.)

Powers of the Smaller War Plants Corp. are considerable and the problem of getting small plants into war production on a wide scale—so often by-passed—may soon be tackled in earnest. The agency has the power to accept prime contracts from war agencies. It can split up such contracts, subcontracting with small companies for production of component parts. At the same time, it can provide engineering and financial assistance, aid to manufacturers to rehabilitate old machinery and in certain cases may help manufacturers acquire new machinery where this is vitally needed.

Millions of words have been written about the place of small metalworking plants in the war program.

Steel Ingot Production by Districts—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)

	Pitts- burgh	Chi- cago	Youngs- town	Phila- delphia	Cleve- land	Buf- falo	Wheel- ing	De- troit	S.Ohio	St. Louis	East	Aggre- gate
Week of July 9 . . .	98.0	101.5	100.0*	92.0	96.5	104.5	86.0	98.0	101.0	102.0	102.0	108.0
Week of July 16 . . .	98.0	102.0	98.5	92.0	98.0	106.5	86.0	98.0	98.5	105.0	102.0	108.0
"Revised												75.0

Managers and employees of such plants now hope for action.

To provide the metal on which modern warfare is based, steel producers this week were holding production at 98 per cent of capacity, unchanged from last week. This high operating rate reflects the all-out efforts of producers to keep their furnaces melting despite all obstacles. In peacetime, many units now operating would be down for repairs but the pressure to build the war machine is forcing producers to squeeze out every possible pound of metal.

Operations in the big Pittsburgh area are unchanged at 98 per cent. Also unchanged are Philadelphia at 92 per cent, Wheeling at 86 per cent, the South at 98 per cent, the West at 102 per cent, St. Louis at 108 per cent and the Eastern area at 76 per cent.

Chicago Rate Up Half Point

Higher operations are reported by Chicago up a half point to 102 per cent, Buffalo two points to 106.5 per cent, Southern Ohio River three points to 105 per cent and Cleveland one and a half points to 98 per cent. Steel output is slightly lower at Youngstown, down one and a half points to 98.5 per cent, from a revised rate last week of 100 per cent and Detroit, down four and a half points to 96.5 per cent.

The scrap situation in some areas is temporarily easier but this condition is not expected to last. At Chicago, two open hearths which had been taken off because of the scrap shortage are now back in production. Monday saw the beginning of the WPB's non-stop national scrap drive. Much of the impetus is scheduled to come largely from the steel industry's \$1,500,000 fund for national advertising. To some observers it seems as if the campaign, which means so much to a continuance of strong melting schedules in the steel industry, could stand a stronger White House send-off, some clarification on the subject of profits for those handling the scrap, and improved coordination of junkmen into the picture. Small junkmen do not collect a large portion of dealers' scrap but nevertheless are an important segment of the scrap industry. With the automobile graveyard situation

being cleaned up and with nationwide scrap drives taking years of accumulated old metal, a decline in the number of small scrap collectors might jeopardize collection of dealers' scrap for the remainder of the war period.

New light is thrown on the pig iron and steel scrap situation with the release by the American Iron & Steel Institute, for the first time, of a 12-month pig iron and steel scrap analysis. The reports show, for example, that the steel industry opened 1941 with an inventory of 3,939,244 tons of iron, steel and alloy scrap, manufactured 25,775,584 tons in addition to 554,506 tons of synthetic, purchased 16,059,889 tons, consumed 43,704,038 tons, sold 461,529 tons and closed the year with an inventory of 2,158,656 tons.

A similar inventory analysis of pig iron shows a 1941 opening inventory of 1,703,238 tons, production during the year of 50,652,120 tons, purchase of 2,610,518 tons, own consumption of 49,485,149 tons, sale of 4,485,149 tons and a closing inventory of 800,155 tons.

Price developments this week included a ruling by the OPA that any person who has entered or who is about to enter into a contract with the U. S. Government or any government accorded lend-lease privileges, can apply for readjustment of a maximum price set up by an OPA regulation if he believes the ceiling price impedes or threatens to impede production of an essential war commodity.

Ceilings Planned On Combat Items

A formula of ceilings on prices of military combat items being drawn up by OPA will take into account overhead rates and pay scales in effect before April 27, Leon Henderson says. The Price Administrator said he has served notice on the Army and Navy that

For details of latest price developments, see page 100A.

he intends to hold government agencies to a section of the price control act which directed them to work with him for fair wages and stabilized prices. "We have taken the position with several industries," he said, "that we will not recognize as a basis for a price in-

crease any increased wages that had not been negotiated before the statement of the President's policy on April 27."

Early this week the steel and allied industries were awaiting the decision of the War Labor Board on the steel wage increase of \$1 an hour opposed by Henderson and the industry itself but advocated by the CIO-USWA.

July apparently will set a new high in the volume of allocations and directives in the steel industry, with some companies reporting 80 to 90 per cent of their business so covered and only a small portion of the July output remaining for A-1-A orders. Reports have cropped up that some fabricating plants making essential war goods have been forced to shut down some departments because they are unable to obtain deliveries on A-1-A material. The steel companies, on the other hand, because of allocations and directives which involve tremendous lend-lease tonnages, have no alternative but to follow orders of the WPB.

Role by Women More Important

A bright spot in the war program is an increase in the flow of workers from training programs. In some areas, fewer men than expected have become available for war plant jobs because of the closing of plants making non-essential goods. As the weeks roll on, the place women will play in war industry work grows more important. For example, Pullman-Standard Car Mfg. Co. expects eventually to employ up to 40 per cent women who will be used chiefly for welding and sheet metal work.

Carnegie-Illinois Steel Corp. plans to use a large number of women as tractor operators, coil winders, crane operators and routine chemical analysts. One company reports there are 75 women applicants for each job.

Holders of distress material stocks are being given some relief

See page 108A for details of this unfreezing of material inventories.

under Priorities Regulation No. 13 which sets up rules governing the sale of idle inventories of specific types.



O E M Photo by Palmer, in an Allegheny Ludlum plant

... But Not to Hitler's Taste

WAR'S emphasis is on *strength*, in men and in steel. That trite little truism is all pictured for you above, where the last admixture of alloys is going into an Allegheny Ludlum electric furnace.

In the shortest possible time after the arc is struck, that batch of alloy steel will be war material in use. It may be stainless bomb racks or ammunition chutes; tool steels fashioning a tank; valves or nitrided shafts in engines; electrical steels in gun and engine controls. What-

ever it is, Hitler definitely won't like the taste of it. Nor will Tojo.

But let's make sure it takes the least amount of time to turn out these finished war goods. And let's not waste, unnecessarily, a single pound of vital alloys in the process.

To help engineers and production men toward more efficient fabrication and use of alloy steels, and to aid in the instruction of training classes, we have developed a wide list of printed aids. They're especially valuable for assisting

"conversion" plants to avoid pitfalls and get under way. Just tell us your alloy steel problems, and let us help you find the answers.



**Allegheny Ludlum
STEEL CORPORATION**
GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA

News of Industry

• • •

Ordnance Chief Calls Our Arms Unbeatable

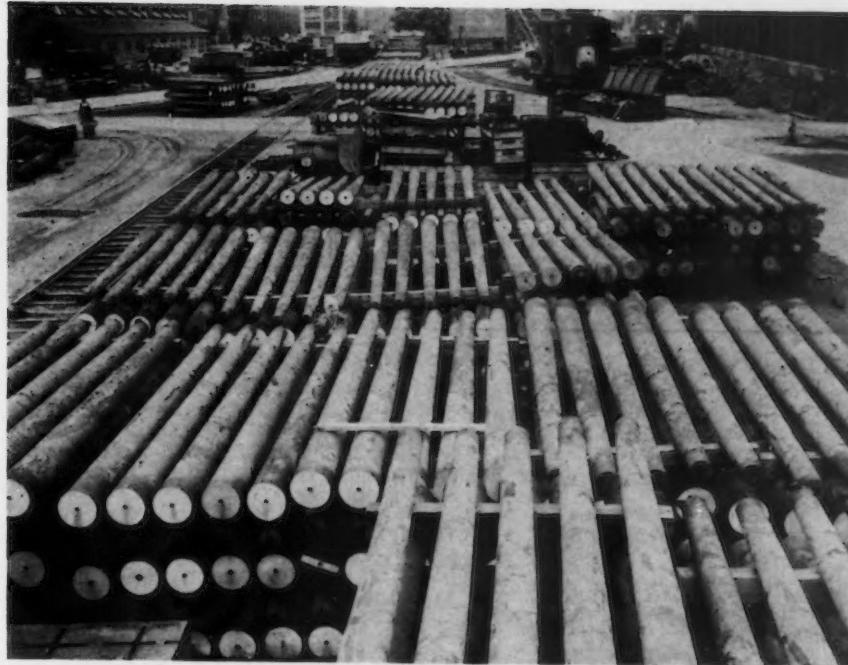
Salisbury, N. C.

• • • Maj. Gen. Levin H. Campbell, Chief of Ordnance, declared that American tanks and guns are superior to those of the enemy and for this he gave credit to the skill of American industry, engineering, laboratories and workmen. His "board of directors," he said, is the best one in the world. On this board are Bernard M. Baruch; K. T. Keller, president of the Chrysler Corp., and Benjamin F. Fairless, president of the United States Steel Corp.

General Campbell said in an address here, recently, that when he phoned Mr. Baruch, asking if he would "help us out," Mr. Baruch replied, "I'll come over and sweep the floor. Whatever you say goes."

"Throughout our war production program are industrialists of the stature of 'my board,'" said General Campbell. "With such great people running things, and with our war factories and arsenals staffed by skilled, mechanically-minded Americans, how can we possibly lose?"

The Ordnance Department, General Campbell said, is alert to all foreign developments in weapons, ammunitions, tanks, mechanized equipment. "You really should see our engineer people move in when they get something some foreign country thinks is new, improved or superior to ours," he said. "There's no mercy shown. If it's something better than we have, which is rarely the case, by the way, we grab it. For example, one gun we're using now is a foreign invention. The thing was a spinning wheel until our engineers, and those of industry,



Wide World Photo
GUN BARRELS: Hundreds of 90-mm. anti-aircraft gun barrels are stacked on the ground of the Watertown Arsenal. The machining of these barrels is shown in the following picture.



Acme Photo
ACK-ACK MACHINING: This big lathe, turning the barrel of a 90-mm. anti-aircraft gun, has three carriages, each carrying two tool blocks to which coolant is piped. Roller-follower rests are pneumatically controlled as is the tailstock. The large bin behind the lathe is for keeping clean gun steel chips segregated.

tackled the job. They made it work better than the inventor himself had any hopes for. Equally important, they adapted it to our mass production methods. When we got it, it was a fair gun, nothing more. American engineers and workmen have converted this gun into a reliable and deadly weapon."

He praised the M1 (Garand) rifle, said that the dependability of the .45-caliber automatic pistols and revolvers stands unchallenged, and declared that the American machine gun will out-function any enemy gun under the most adverse service conditions.

"Our tanks are superior to anything the enemy has," declared

NEWS OF INDUSTRY

General Campbell. "Type for type, our tanks have heavier guns, heavier armament and greater speed. I'm not talking through my hat. I know. We've captured enemy tanks, both German and Japanese, and we have conducted every conceivable engineering test upon them. These tests, incident-

tally, are quite aside from the pounding our tanks have given the enemy.

"The best proof is the proof of battle. Our tanks have more than met the trials of combat.

"Riveted-tank hulls have lately been criticized. They have been termed death traps. We switched

to welded and cast hulls, not because there was any truth in the death trap story, but because we can build tanks faster by welding and casting. Riveted tank hulls are still used by the enemy. Our riveted tank hulls are not the death traps they have been said to be. The critics have never seen the inside of one of them, else they would know, as I know, an armor plate facing protects the crew from a knocked out rivet, which is a rarity in tank warfare, anyway.

"I have read of the new German 88 mm. gun. This weapon is about as secret as a daisy water pistol. It has been known to us and our allies for at least 10 years. We outmatch this gun with several of our field and anti-tank guns. The German 88 mm. gun is an antiquated, or, let us say, an obsolescent, anti-aircraft gun, with a carriage too slow to function against high speed planes. Its high velocity, however, makes it a good anti-tank weapon.

"Guns are machines. Nobody in the world makes better machines than are made in the United States. You wouldn't believe Germany or Japan could make better automobiles. Don't believe they can make better guns, they can't."

BRITISH "LANCASTER": Four-engined ships of this type took part in the 1000 mile daylight "roof top" raid April 17 on Augsburg, near Munich. The Maschinenfabrik Augsburg Nurnberg A.G. factory, which makes at least half of the Nazi U-boat engines, as well as tank power units, was heavily bombed. Of the 12 ships detailed for the raid, eight reached their target and five returned safely.

British-Combine Photo



BOEING "SEA RANGER": This new, long-range experimental ship built for the Navy by Boeing Aircraft Co., is called the Sea Ranger, X PBB-1. Although as heavy as four-engined ships of similar design, it is powered by two engines, and is expected to have a longer range and carry a greater bomb load than any Naval plane now in service.

Acme Photo



.70 TONS OF DESTRUCTION: The Glenn L. Martin Co.'s 70-ton "Mars" flying boat, built for the U. S. Navy, made a successful maiden flight on July 3. This air battleship, the largest flying boat in the world, was tried last September, but an accident sent it to the shop for repairs before it actually flew.

Press Association Photo



Academy of Sciences Aiding War Agencies

• • • Frank B. Jewett, president of the National Academy of Sciences, has announced that the academy's Metals and Minerals Advisory Committee has furnished OPM and WPB with 113 reports during the past 18 months. Fifty-three of these were on metals substitution and conservation; 47 on ferrous minerals and ferro-alloys; 4 on tin smelting and reclamation, and 9 on non-metallic minerals.

A new War Metallurgy Committee has been set up to appraise and conduct needed research work for the Army, Navy, other government departments and industry. The committee is to function as the nerve center for all metallurgical research organizations and departments in the country, since it makes available the services of all metallurgical research, personnel and facilities. There are more than 10,000 such individuals in this country, and their combined experience represents well over 125,000 man years. While it is not the place of the committee, according to Dr. Jewett, to be the repository for new suggestions and ideas, it recognizes as part of its job the appraisal of such of these problems and possibilities as are referred to it by the WPB or the Office of Scientific Research and Development.

Another function of the committee is to digest and make available the results of Canadian and English metallurgical research.

Typical of the problems referred to this committee is one asking for improvement in welding processes. The time involved in such research projects naturally varies. The report of the sub-committee, on many such projects, is made available within a matter of days, but the project itself may take anywhere from two to six months, stated Dr. Jewett, depending upon the nature of the research.

C-I Repairs Gary Furnace Chicago

• • • Carnegie - Illinois Steel Corp.'s No. 2 blast furnace at Gary was taken out of blast last week for repairs.



COLLEGE OF AIRPLANE KNOWLEDGE: Glenn L. Martin Co. set up a college where soldiers study the best methods of "keeping 'em flying." Graduates of Army Air Forces Technical Training Schools take a 34-day course to apply in practice what has been learned in theory in earlier training. On graduation, they know all there is to know about the Martin bomber. Courses start every 12 days, with 175 men in each course.

Cooper-Bessemer Adopts 7 Employee Ideas in Month

Mount Vernon, Ohio

• • • Workmen at the Cooper-Bessemer Corp. have made 36 plant improvement suggestions in the month since inauguration of a labor-management co-operation plan, under the direction of the WPB. Seven of the suggestions have been put into effect. The cooperative effort is under the direction of a general committee headed by L. F. Williams, a corporation director. Production and suggestion committees are responsible to the general committee.

Army Saves Laundry Steel Washington

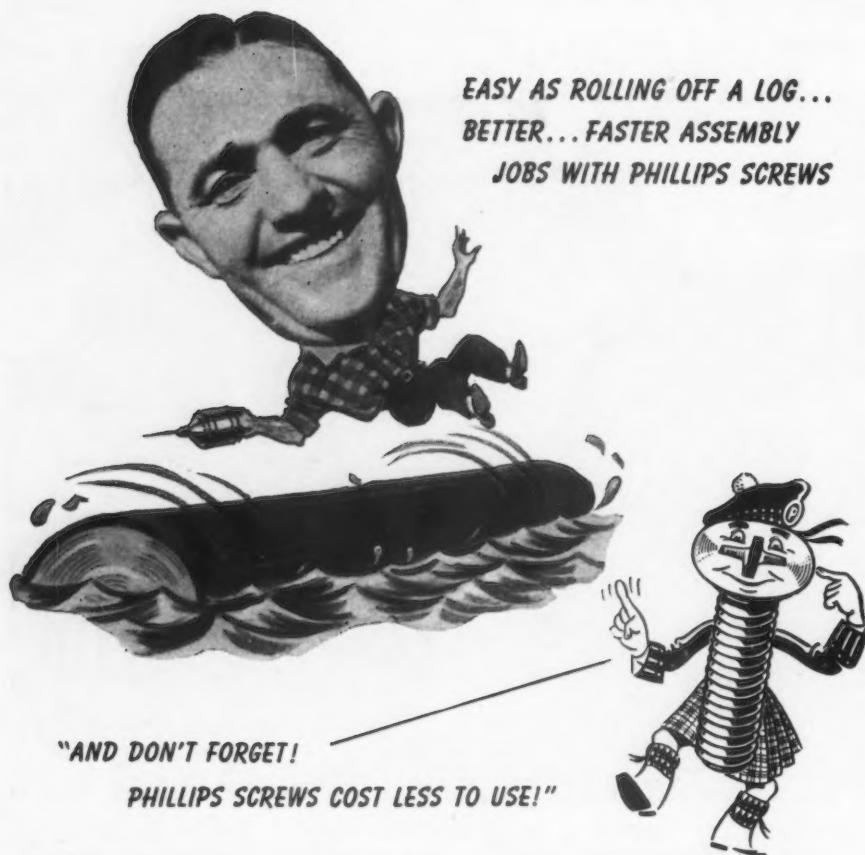
• • • Cast steel housing on the generators of the Army's laundry units is being changed to cast iron, releasing steel for war production, and saving \$45 per unit. The Quartermaster Corps recently bought 1294 mobile laundry units and 153 mobile sterilization bath units of the new type for overseas use.

Farm Engineering Authority Awarded McCormick Medal

• • • William D. James, president of the James Mfg. Co., Fort Atkinson, Wis., was awarded the Cyrus Hall McCormick Medal by the American Society of Agricultural Engineers at Milwaukee July 1. The award is for exceptional and meritorious engineering achievement in agriculture.

St. Louis Blast Furnace To Be Rebuilt in Mexico Warren, Ohio

• • • Hetz Construction Co. is dismantling a blast furnace at South St. Louis, Mo., in order to move the unit to Monterey, Mexico, for rebuilding. The furnace had been idle 18 years and was owned by the Mississippi Valley Iron Co. which went into bankruptcy Nov. 22, 1940. In March the U. S. government took over the furnace, which is being transferred to National Financiera, S. A., Mexico City, for whom American Rolling Mill Co. is acting as agent.



One Hand Driving • Power Tools • Tighter Assembly = 50% Less Assembly Time with Phillips Screws

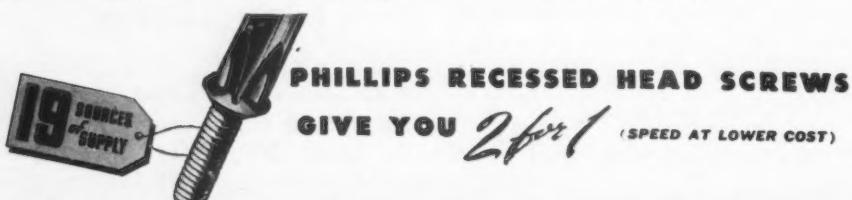
B. P. (Before Phillips). Slow-driving slotted screws required two hands to aim the screw and steady the work — and still accidents happened, causing plenty of mangled fingers or scars in the work. Always something going wrong — crooked screws — heads splitting — burrs to remove — loose assemblies. Thank goodness those days are gone forever!

A. P. (After Phillips). Faster-driving Phillips Recessed Head Screws need only one hand . . . the other hand is free for support. No fumbled screws — straight, effort-

less driving. Even when assembling parts already finished — like enameled, painted or other easily-scratched surfaces — power driving is safe, because there's no danger of driver slippage. And screws can be set up tight without heads splitting or raising burrs.

Your assembly crew will find it "easy as rolling off a log" to produce better work . . . in half the time . . . at a 50% cost saving with Phillips Screws.

For facts and screws write any firm listed below.



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The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio

Whitney Screw Corp., Nashua, N.H.

New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Phoebe Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

Fluorescent Fixture Circuit Permits Saving of Metals

• • • Development of a new circuit for fluorescent lighting fixtures and a specially designed ballast control unit—a system which makes possible a saving of critical metals and also improves lighting efficiency—was announced recently by General Electric lamp department at Nela Park, Cleveland. The basic idea was conceived and developed by J. H. Campbell, a young G. E. lighting engineer, to whom the patent was issued.

The new fluorescent circuit permits the use of only one ballast—or control unit—with four 100-watt Mazda fluorescent lamps in place of the present 100-watt fluorescent fixtures which require two ballasts for four lamps.

The two lamps on each phase of the new circuit start in sequence and operate in series. Thus, one ballast does the work of two, effecting important economies in any fluorescent installation where the new circuit can be used. Although it is designed for use only with 100-watt fluorescent lamps and on 254, 265 and 277 volt circuits, many of the new war industry plants have this voltage available and other plants now being converted to war work can be changed over to take advantage of this circuit.

Col. Bomar Heads Ordnance Office at Birmingham

Birmingham

• • • Col. E. C. Bomar, formerly stationed at Frankford Arsenal, Philadelphia, has been named chief of the Birmingham Ordnance District, succeeding Col. Theodore Swann, who has not been on active army duty. Col. Swann, president of Swann Chemical Corp., Birmingham, has been appointed chairman of the ordnance district's seven-man advisory board, whose membership includes Robert Gregg, president of the Tennessee Coal, Iron & Railroad Co.; Erskine Ramsay, board chairman of Alabama By-Products Corp., and W. D. Moore, president of American Cast Iron Pipe Co. The Birmingham Ordnance District is comprised of Alabama, Georgia, Louisiana, Florida and Mississippi.

Australia Seeks Machines For Munitions Manufacture

New York

• • • Next to aircraft, the greatest need of Australia today is machine tools, according to L. H. Hartnett, Australian director of ordnance production. Mr. Hartnett is in this country gathering information on ordnance manufacture and is particularly interested in obtaining data on alternate methods for doing certain standard jobs. Mr. Hartnett, who before the war was managing director of General Motors' Australian plants, indicated that Australian industry had gone the limit in improvising existing facilities to make war goods, but was badly in need of help along technical lines from American manufacturers and engineers.

He indicated that, at the present time, the small arms industry in Australia is almost self-sufficient. Besides, many other ordnance items are being made, including the Bren gun, the Lewis machine gun, 3.7-in. anti-aircraft gun and the Vickers predictor to go with it, a 3-in. anti-aircraft gun, the Bofors 40-mm. anti-aircraft gun and a 25-lb. howitzer. He displayed a light weight sub-machine gun that could be turned out at extremely low cost. Patterned after the Sten gun made in Great Britain, the modified Austen gun uses both die castings and stampings, as well as forgings for the principal parts.

In Australia, many of the large manufacturers act as major co-ordinating contractors in handling the production of ordnance work. The former assembly plant of General Motors, for example, is being used mostly for the assembly of the 25-lb. howitzer from parts made by 25 subcontracting shops. As major coordinating contractors, General Motors controls incoming material and disperses it to the subcontractors and also handles all inspection in these smaller plants.

Mr. Hartnett introduced Alfred Mealand, head of the machine tool division of the Australian War Procurement Commission, 25 Broadway, New York, who is here to coordinate machine tool purchases. Mr. Mealand is anxious to receive catalog material from machine tool manufacturers in this country.

MORE PULL for PRODUCTION



New, groove-gripping unit jackets of special flexible fabric filled with tough, live black rubber . . . transmit maximum power from and to the sheaves. Parallel "Cable-Core" construction places load carrying cable-like cords in the neutral section where deteriorating "flexations" are at an absolute minimum. Stretch-taking section above "Cable-Cores" is of special extensible rubber compounds. Compression section below is designed to resist "crimpage" when belts are flexed around pulleys. Belts cured in precision molds to produce exact cross sections that will fit true in the sheave grooves.

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NEWS OF INDUSTRY

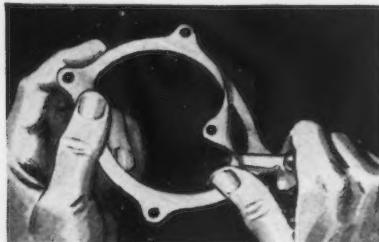


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1813

Weirton Steel Charges NLRB Hearing Unfair Pittsburgh

• • • United States Circuit Court of Appeals for the Third Circuit was petitioned on behalf of the Weirton Steel Co. last week to hold a hearing on charges that the company was willfully denied a fair and impartial hearing before the National Labor Relations Board and that the actions taken by the Labor Board in the case were invalid and contrary to law by reason of the board's prejudice, hostility and improper conduct.

The petition also requests a stay of proceedings on the petition for enforcement of the National Labor Relations Board order in the Weirton case which the board recently filed with the same court.

In the Weirton petition, improper conduct is ascribed not only to the trial examiner and other agents of the Labor Board who actively participated in the Weirton hearing but also the National Labor Relations Board members who, at the time of the hearing were J. Warren Madden, chairman; Donald Wakefield Smith and Edwin S. Smith.

The Weirton hearing is one of the longest Labor Board cases on record. It began in New Cumber-

land, W. Va., near Weirton, on Aug. 16, 1937, and continued, with a number of interruptions, until Jan. 31, 1939. More than 300 former employees of the company were named as claimants in the case, while thousands of exhibits were entered and a record of more than 39,000 pages was built up by the testimony of several hundred witnesses.

New "Minute Man Flag" Presented to Ex-Cell-O

Detroit

• • • First of a new kind of Minute Man flag to be issued to any American manufacturing plant was presented here Wednesday, July 8, to the Ex-Cell-O Corp. by Frank N. Isbey, chairman of the War Savings Committee for Michigan. The flag, with a red and white bullseye superimposed on the familiar Minute Man figure, will show that employees of the corporation not only have met the quota of buying war savings bonds and stamps to the amount of 10 per cent of their pay, but are exceeding their quota. The flag was presented to Phil Huber, president of Ex-Cell-O, with public officials and Lieut. Jack A. Simms, of Kalamazoo, who took part in the bombing of Tokyo, present at the ceremony.

TANK MAINTENANCE: Ordnance tank maintenance crews train for the job of keeping these steel-splitting monsters in perfect working order under combat conditions. This tank track is rolled up for repair.

Harris & Ewing Photo



NEWS OF INDUSTRY

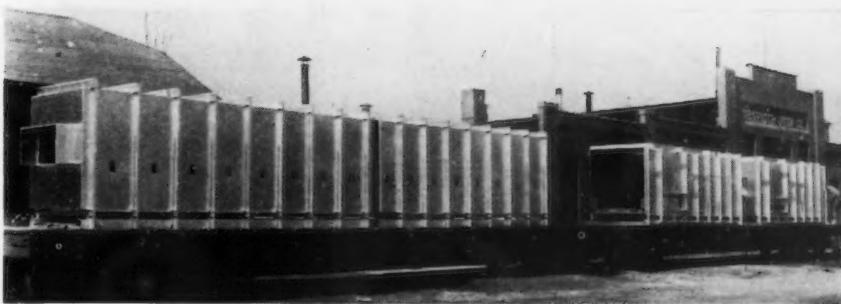
Railroads' Substitutes Save Much Metal, Rubber

Washington

• • • By resorting to substitutes or alterations in specifications the railroads are saving thousands of tons of critical and scarce materials, the Association of American Railroads says.

This aid to the war effort covers conservation of copper, rail angle bars and tin, while at the same time a joint committee of the Mechanical and Purchases and Stores Division of the Association has just completed a study as to possible savings in the use of rubber.

By reducing the amount of copper used in locomotives, air brakes, signal apparatus, telephone and telegraph communication and in journal boxes, the railroads have been able to bring about a saving of approximately 10 per cent of the nearly 50,000 tons of copper normally used each year.



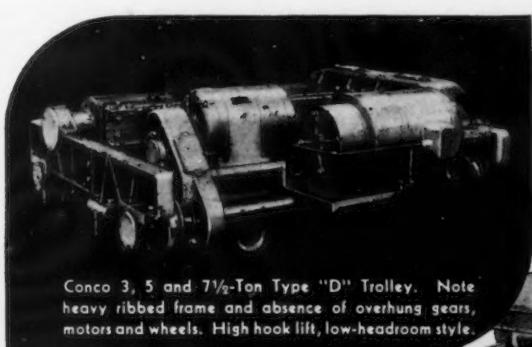
HEAT TREATING FURNACES: These two large, continuous conveyor furnace bodies, part of a number which have been shipped to a war plant for use in heat treating brass and steel shell cases, are shown here ready to leave the Despatch Oven Co. plant. Furnaces are direct gas fired, using externally mounted recirculating air heaters.

Rail angle bars have been standardized at 24 in. Formerly these bars were from 24 to 39 in. in length. The annual saving amounts to about 12,000 tons of steel.

Under revised specifications babbitt metals have been developed so as to contain less tin.

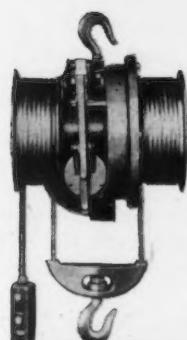
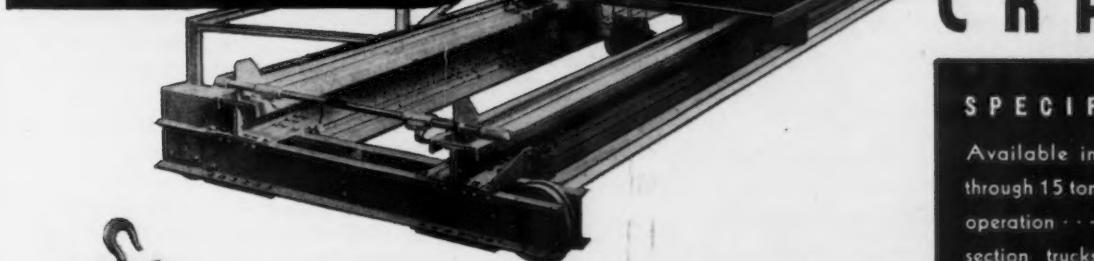
The committee that studied means to save rubber found that,

without interfering with safety or efficiency, fibre, plastics, felt, reclaimed rubber and various other materials can be used in making approximately 170 different parts and appliances which now use rubber. In the manufacture of nearly 70 other items made either entirely or partially of rubber, the committee found that the amount of rubber could be reduced.



Conco 3, 5 and 7½-Ton Type "D" Trolley. Note heavy ribbed frame and absence of overhanging gears, motors and wheels. High hook lift, low-headroom style.

THE U. S. WAR DEPARTMENT USES CONCO DOUBLE GIRDER ELECTRIC CRANES



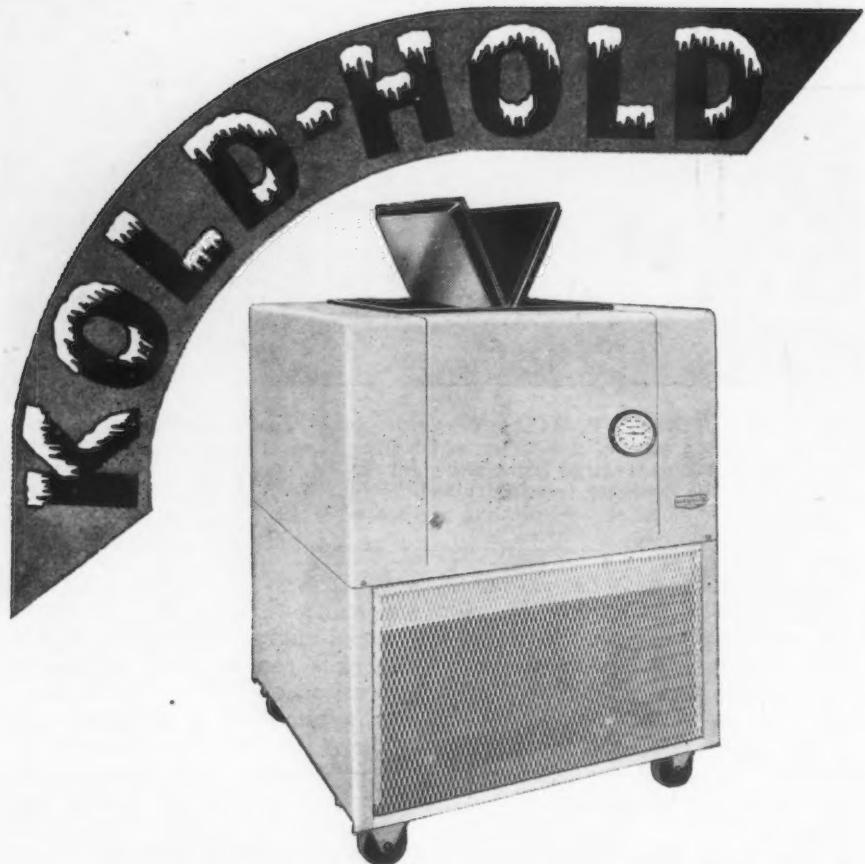
BY BUILDERS OF CONCO TORPEDO ELECTRIC HOIST

The CONCO TORPEDO ELECTRIC HOIST is available in capacities of 250-lb. — \$139.50, 500-lb. — \$149.50, 1000-lb. — \$159.50. Cut-away view shows outstanding features that include: Push button control; Solenoid electric brake; Double drum construction — for perfect balance; Hook, bolt or trolley suspension; Positive limit switch. Heavily constructed, employing only two gear reductions — one worm gear and one spur gear. One of Conco's complete line of hand-powered and electric cranes, hoists and trolleys. Write for literature.

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Canada's Steel Capacity Will Be Expanded Again

Toronto

• • • Plans are proceeding for a much greater expansion of Canada's primary steel industry. The Steel Co. of Canada Ltd., Hamilton, and Dominion Steel & Coal Corp. Ltd., Sydney, N. S., now are engaged in installation of additional open hearth furnaces and these will be adding to production within the next two or three months. During May a further 30,000 net tons were added to Canada's steel ingot and castings capacity, while in the month of April 33,000 tons were added which brings increased capacity—basic open hearth, converter and electric—up 104,000 tons in the last four months. At the present time Canada's capacity for production of steel ingots and castings is 3,268,000 net tons annually, about 1,000,000 tons greater than the 2,300,000 tons possible at the end of 1939.

While primary steel production in this country has jumped 42 per cent since the outbreak of war, demand, through the establishment of war industries, has gained on a much broader scale. It is estimated that Canada's total steel requirements exceed production in this country by about 100 per cent at the present time. In the past few weeks the Ottawa government has taken drastic action regarding civilian and non-essential industry and has shut out all deliveries of steel to these consumers in an effort to meet actual war requirements. Restrictions also are being placed on use of steel and other metals for so-called essential industry.

To the present Canada has been fairly successful in obtaining steel supplies from the United States but a feeling is developing here that there may be trouble in obtaining imports of steel.

One in Eight Bell Aircraft Workers Is Woman

Buffalo

• • • One out of every eight workers in the Bell Aircraft Corp.'s Buffalo area plants is a woman, Lawrence D. Bell, president, announced. Eventually, he said, as many as 60 per cent of aircraft workers in his plants may be women.

British Columbia Ship Workers Tied to Jobs

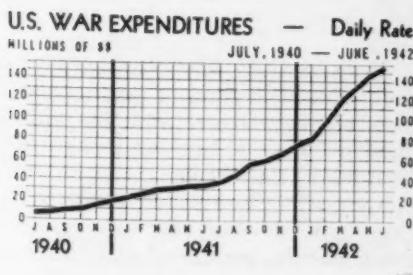
Ottawa

• • • The Canadian government has passed an order-in-council making it an offense for any shipyard workers in British Columbia to refuse to work or to quit work in any shift to which he has been assigned under the government's plan for seven-day operation of west coast shipyards. The order also makes it an offense for any shipyard operator not to organize operations so that the work is carried on continuously throughout the week.

\$4.8 Billion Placed by Canada in War Contracts

Ottawa

• • • War contracts placed and commitments made in Canada by the Department of Munitions and Supply and its predecessors on Canadian, United Kingdom and other accounts for the period July 14, 1939, to June 30, 1942, have reached the grand total of \$4,877,063,532. Contracts placed on Canadian account, including contracts executed for plants and plant extensions, a portion of which is chargeable to other Empire countries under the British Commonwealth Air Training Plan, general purchases, and contracts amounting to \$36,350,004 awarded by the Civil Aviation Division, Department of Transport, for airport construction, totaled \$2,453,698,533. The aggregate for stores placed on United Kingdom account, together with United Kingdom commitments for plants and plant extensions and orders for the output of some of these plants, amounted to \$2,046,646,193, an estimated figure which includes the United Kingdom's share in joint projects. Contracts awarded on other accounts totaled \$340,368,802.



TREAT CHAINS WELL—THEY'LL SURVIVE HARD SERVICE

Save Steel—Save Time-- by following these simple instructions--

War calls for chain, more and more of it. Many workers are inexperienced. Everybody is in a hurry. To protect men and the load let your workers know the importance of these simple rules:

LOADS

1. Don't overload a chain or sling.
2. Take up slack and start load slowly.
3. Don't jerk chain from under load.
4. Be sure load is balanced.
5. Avoid "impact loading"—a load dropped suddenly on the chain.
6. Indicate the safe load for each chain with a metal tag, or stamp it on the ring or hook, or paint the ring or hook a color which is identified with the safe load figures on the chain rack.

Further suggestions on the selection, application, use, inspection and maintenance of chain will be sent on receipt of details regarding character of load, operating conditions and special problems or difficulties involved.

AMERICAN CHAIN DIVISION

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles,
New York, Philadelphia, Pittsburgh, San Francisco

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT • CONNECTICUT

42.5 Million Tons of Ingots in 6 Months

• • • Production of steel ingots and castings in the first six months of 1942 established a new peak of 42,570,247 net tons, more than 4 per cent above production in the corresponding period of the record-breaking year 1941, according to the American Iron & Steel Institute.

Open hearth steel production in the half-year just ended amounted to 37,889,027 tons, or 2 per cent above the first half of last year, and Bessemer steel production of 2,798,856 tons was 8 per cent higher.

Production of electric furnace steel in the first six months of 1942 totaled 1,882,364 tons, or almost half again as much as was produced in the corresponding period of 1941.

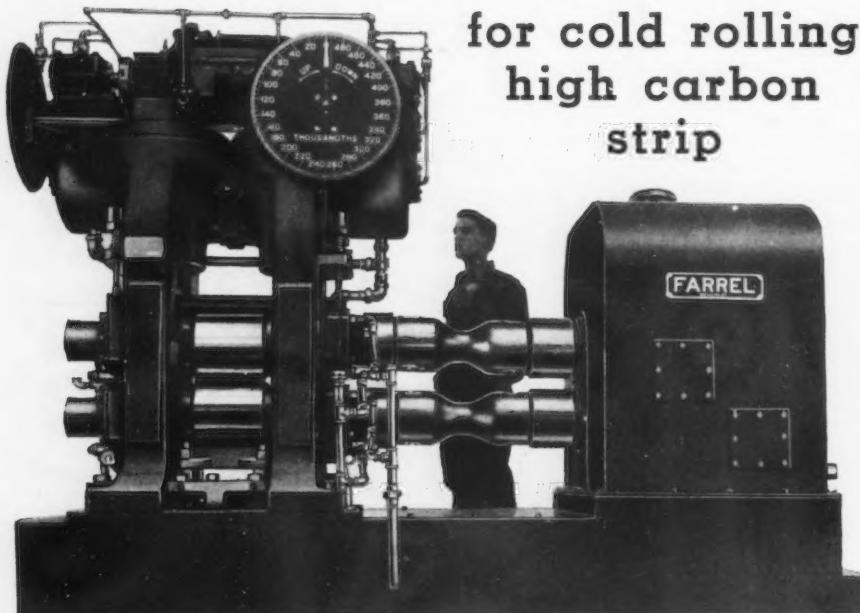
Total steel production in the month of June was 7,022,155 tons, equivalent to 96.4 per cent of capacity. By comparison, production in May amounted to 7,386,890 tons, 98.2 per cent of capacity.

In June a year ago, 6,792,751 tons of steel were produced, equivalent to 98.1 per cent of what was then the industry's capacity.

An average of 1,636,866 tons of steel was produced per week in June, as against 1,667,470 tons per week in May and 1,583,392 tons per week in June, 1941.

NEW HIGH-SPEED HIGH-PRECISION FARREL MILL

for cold rolling high carbon strip



Ruggedly built for continuous, high-speed operation, this new Farrel 10" x 10" Two-High Rolling Mill is also specially designed to insure high accuracy and close control of gauge in cold rolling high carbon steel strip.

A feature is the built-in screwdown, which is extremely high-powered to adjust the gauge on high carbon steel under full load. This screwdown provides ease of manipulation and facilitates setting the rolls with extreme accuracy. Duplex control is provided for operating either screw independently or synchronizing both screws through magnetic clutches.

The rolls are forged alloy steel, heat treated and hardened. They are carried in

precision-type, flood-lubricated sleeve bearings and are connected to the pinion stand with universal spindles. The mill housings are of cast steel of heavy section for maximum strength and rigidity.

The mill is driven by a variable speed, reversing motor through a combined reduction gear unit and pinion stand, with Farrel-Sykes continuous tooth herringbone gears and mill pinions mounted in anti-friction bearings in a welded steel housing.

Farrel Rolling Mills are designed and built to fit individual conditions of operation, and experienced engineers are available for consultation to assist in working out applications to special production requirements.

72% of Labor-Management Plants Are Unionized

Washington

• • • Seventy-two per cent of the two million men in plants with labor-management committees are union members, according to a WPB survey of 922 of the 999 plants participating in the plan. In the New England, Middle Atlantic and Great Lakes states, the larger proportion of employees are members of the CIO, while AFL unions are stronger in the North, North Central and Southwestern states. Affiliation totals are as follows:

Affiliation	No. of Plants	No. of Workers	Per Cent of Workers
CIO	310	789,886	38.5
AFL	132	247,952	12.1
Independent	67	216,692	10.6
Varied	43	220,154	10.7
Unknown	370	576,914	28.1
Totals	922	2,051,598	100.0

The average number of employees per plant where no union has been reported is 1,559, compared with the over-all average of 2,225 per plant.

Bethlehem's June Operations Were at 99.2% of Capacity

• • • Bethlehem Steel Co. during the month of June operated at 99.2 per cent of its capacity, producing 1,005,000 tons of steel, in spite of the fact that the Bethlehem plant at Bethlehem was still recovering from the flood which occurred the last part of May.

Outstanding are the production of 43,000 tons of pig iron on one blast furnace, and the shipment of 167,000 tons of structural material and 155,617 tons of plates. The converted strip mill, formerly devoted to automobile body sheets, produced 56,000 tons of plates.

FARREL FARREL-BIRMINGHAM COMPANY, Inc.
ANSONIA, CONN.
New York • Buffalo • Pittsburgh • Akron • Chicago • Los Angeles

Steel Output in Half Year Sets Record

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1941

Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January.....	6,274,780	99.0	451,806	76.0	195,766	89.1	6,922,352	96.8	1,562,608	4.43
February.....	5,669,425	99.1	378,536	70.5	182,393	91.9	6,230,354	96.5	1,557,589	4.00
March.....	6,457,641	101.9	460,225	77.4	206,137	93.8	7,124,003	99.6	1,608,127	4.43
1st Quarter...	18,401,846	100.1	1,290,567	74.8	584,296	91.6	20,276,709	97.7	1,576,727	12.86
April.....	6,137,613	100.0	395,056	68.6	221,510	104.1	6,754,179	97.6	1,574,401	4.29
May.....	6,362,245	100.4	444,079	74.7	238,241	108.4	7,044,565	98.5	1,590,195	4.43
June.....	6,098,171	99.4	458,848	79.7	235,732	110.8	6,792,751	98.1	1,583,392	4.29
2nd Quarter...	18,598,029	100.0	1,297,983	74.3	695,483	107.8	20,591,495	98.1	1,582,744	13.01
1st 6 months...	36,999,875	100.0	2,588,550	74.6	1,279,779	99.7	40,868,204	97.9	1,579,753	25.87
July.....	6,085,100	94.4	489,297	85.0	237,827	85.7	6,812,224	93.3	1,541,227	4.42
August.....	6,244,353	96.6	495,761	85.9	257,382	92.6	6,997,496	95.6	1,579,570	4.43
September.....	6,054,418	96.9	500,768	89.8	256,568	95.5	6,811,754	96.3	1,591,531	4.28
3rd Quarter...	18,383,871	96.0	1,485,826	86.9	751,777	91.2	20,621,474	95.1	1,570,562	13.13
9 months.....	55,383,746	98.6	4,074,376	78.6	2,031,556	96.4	61,489,678	96.9	1,576,658	39.00
October.....	6,423,329	99.4	533,060	92.4	279,679	100.6	7,236,068	98.9	1,633,424	4.43
November.....	6,194,679	99.0	488,822	87.5	277,384	103.0	6,960,885	98.2	1,622,584	4.29
December.....	6,387,865	99.0	481,813	83.7	280,637	101.2	7,150,315	97.9	1,617,718	4.42
4th Quarter...	19,005,873	99.1	1,503,695	87.8	837,700	101.6	21,347,268	98.3	1,624,602	13.14
Total.....	74,389,619	98.8	5,578,071	80.9	2,869,256	97.9	82,836,946	97.3	1,588,741	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons Bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Jan. 1, 1941, as follows: Open hearth 74,565,510 net tons, Bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on weekly capacities of 1,459,132 net tons open hearth, 130,292 net tons Bessemer and 62,761 net tons electric ingots and steel for castings, total 1,652,185 net tons; based on annual capacities as follows: Open hearth, 76,079,130 net tons, Bessemer 6,793,400 net tons, Electric 3,272,370 net tons.

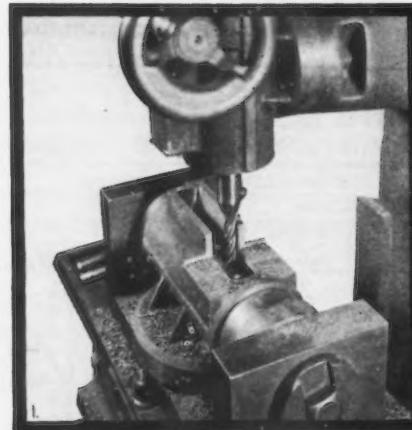
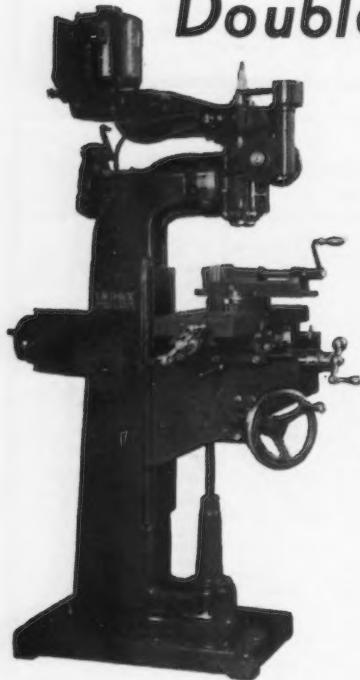
YEAR 1942

Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production

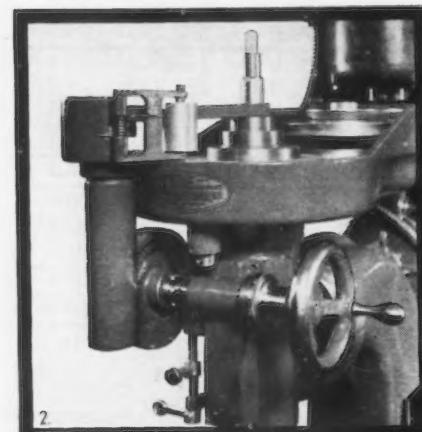
Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January.....	6,328,128	95.4	490,864	86.0	305,930	96.3	7,124,922	94.7	1,608,335	4.43
February.....	5,791,813	96.7	453,543	88.0	275,700	96.2	6,521,056	96.0	1,630,264	4.00
March.....	6,574,701	99.1	493,294	86.4	324,916	102.3	7,392,911	98.2	1,668,829	4.43
1st Quarter...	18,694,642	97.0	1,437,701	86.7	906,546	98.3	21,038,889	96.3	1,635,994	12.86
April.....	6,346,707	98.8	454,583	82.2	321,023	104.4	7,122,313	97.7	1,660,213	4.29
May.....	6,600,376	99.5	454,054	79.5	332,460	104.7	7,386,890	98.2	1,667,470	4.43
June.....	6,247,302	97.2	452,518	81.8	322,335	104.8	7,022,155	96.4	1,636,866	4.29
2nd Quarter...	19,194,385	98.5	1,361,155	81.2	975,818	104.6	21,531,358	97.4	1,654,985	13.01
1st 6 months...	37,889,027	97.8	2,798,856	83.9	1,882,364	101.5	42,570,247	96.9	1,645,545	25.87
July.....										4.42
August.....										4.43
September.....										4.28
3rd Quarter...										13.13
9 months.....										39.00
October.....										4.43
November.....										4.29
December.....										4.42
4th Quarter...										13.14
Total.....										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942 as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons.

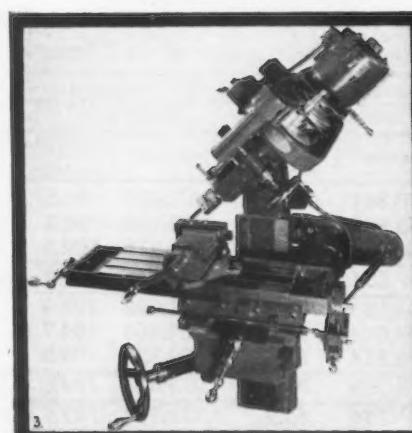
A Vertical Miller that Doubles in Jig Boring!



Precision end-milling



Power drive to spindle quill



Head swivels 90° each way

THREE'S almost no limit to what an end mill will do when it is driven by a superior spindle such as is standard equipment on every 40-H Index Mill. Spindles that run in super precision preloaded ball bearings lubricated at the factory for ordinary service indefinitely.

As a vertical miller it's a wonder, but hundreds of users say they use the machines largely for jig boring. The machine has slow spindle speeds for boring (besides the fast speeds for end milling), power feed to spindle, verniers for locating and precision construction everywhere so that the verniers will really mean what they say. An unusual machine at an unusually low price.

BLANK & BUXTON MACHINERY CO.
3100 EAST MICHIGAN AVENUE — JACKSON, MICHIGAN

40-H INDEX

A Tried and Proven Machine for Milling, Drilling and Boring in the Tool, Die, Experimental and Production Shops

NEWS OF IND

Ordnance Workers Reject AFL and CIO Unions

Morgantown, W. Va.

• • • Workers at the Army Ordnance Works here, in an NLRB election here last week, rejected both the AFL Building Trades Council Unions and the CIO United Mine Workers District 50 as a collective bargaining agency. The outcome showed 84.1 per cent of the employees opposing the union, 14.1 per cent favoring the AFL and 1.8 per cent favoring the CIO.

Trade Notes . . .

American Electro Metal Corp. has moved its offices to 165 Broadway, New York.

Benwood Linze Co., St. Louis, maker of electrical rectifiers and rectifier transformer assemblies, has bought the Fore Electric Co., St. Louis, manufacturer of battery chargers, magnetizers, transformers and meters. The Benwood company will continue to make and distribute Fore company products.

Panama City Shipbuilding Corp., Panama City, Fla., has changed its name to Panama City Shipbuilding Division of J. A. Jones Construction Co., Inc., Charlotte, N. C.

Lester Engineering Co. and **Phoenix Machine Co.** have formed **LESTER-PHOENIX, INC.**, Cleveland, to act as national distributors of Lester injection molding machines and Lester-Phoenix die casting machines.

H. M. Harper Co.'s New York office has been moved to 45 West Broadway, and the staff enlarged. Mr. Earle A. Channer, for many years a member of the sales department at the company's main office in Chicago, is manager. Mr. Edwin D. Higgins and Mr. Eliot S. Jackson recently joined the New York staff.

A. J. Hofmann, engineering sales company, has moved into larger quarters at 31 North Narberth Avenue, Narberth, Pa. New subdivisions of the company include: under direction of Frank W. Hofmann, compressors, diesels, steel buildings and contractors' equipment; under direction of E. L. Hofmann, liquidation of idle new and used steel and general surplus materials.

Cincinnati Bickford Tool Co., Cincinnati, has named the following sales representatives, to replace Henry Prentiss & Co. who have discontinued business: Wigglesworth Machinery Co., 199 Bent Street, Cambridge, Mass., to cover New England; Rudel Machinery Co., 200 Fifth Avenue, New York, L. H. Pratt, W. O. Graham and Frank Hamilton, associates, to cover eastern New York and northern New Jersey; C. H. Briggs Machine Tool Co., Inc., Onondaga Hotel Building, Syracuse, to cover central New York and northeastern Pennsylvania; George Keller Machinery Co., 1807 Elmwood Avenue, Buffalo, E. F. Morgan and J. A. Carter, associates, to cover western New York.

New Type Window Pane Withstands Explosions

• • • A new type window pane of transparent plastic laminated with wire mesh which will withstand the explosion of a 150-lb. bomb, eight feet away, has been developed for use in military construction and industrial plants in potential air raid zones, it has been announced by the Plastics Division of Monsanto Chemical Co. The development was done in co-operation with the United States Navy to end the menace of flying glass.

Under vacuum shock conditions it has stood up without appreciable damage under a 28-in. vacuum, while clear glass shattered at 15 in. and heavy wire reinforced glass at 26.

The new material consists of a standard 16 mesh wire screening, sandwiched between two sheets of Vuelite, Monsanto's transparent cellulose acetate sheeting originally developed for fluorescent light fixtures.

Sheets of the laminated plastic can be drawn or formed almost to any desired shape. However, eight standard sized panels are recommended, ranging from 9½-in. square to 19½ x 24½ in. The standard panels are drawn with a quarter-inch flange which can be easily and quickly fastened to a wood sash with an automatic stapler and then putty to form a weather-tight, permanent installation.

Iron Ore Mines Face Problem Obtaining Necessary Trucks

Cleveland

• • • Iron ore experts here predict that unless some speedy action is taken by Federal authorities, iron mines may find themselves short of necessary trucks to transport the ore to rail heads or other shipping points. These trucks see such intensive service that they are usually worn out after two years.

In the event that the mines do not receive all the trucks they require they would be unable to lay rails as a substitute measure, since rails are as difficult to secure as trucks are. Moreover, this would create a need for a larger amount of rolling stock to make up for the lack of trucks and new freight cars which are also very difficult to secure.

ROEBLING Wires
ROUND . . . FLAT . . . SHAPED

A FEW WIRES TYPICAL
OF ROEBLING'S BROAD
SPECIALTY PRODUCTION

AT WIRE TO
SPECIFICATIONS

FOR PARTS
THAT
Must not
FAIL!

SHAPED WIRE

HIGH CARBON
WIRE FOR MACHINE
GUN RIVETS

FOR FAST OFFENSE PRODUCTION
of parts that *must not fail*, turn to Roebling for the right round, flat, or shaped wire stock. This high carbon wire for machine gun rivets, made by Roebling's special process, for example, shows our ability to meet unusual and exacting metallurgical and physical specifications, and to produce to standards of uniformity that approach perfection.

Whether your specifications call for close dimensions, unusual shapes, uniform temper or special finish, remember that Roebling has built a reputation solving wire problems, and has the experience and facilities to solve yours. Prompt action on war orders.



JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY • Branches and Warehouses in Principal Cities

New High Reratings to Be Used for Emergencies Only
Cleveland

• • • So far as can be determined, there will only be three ratings in the AA group, namely AAA, AA-1 and AA-2. It is understood that these ratings will be given out sparingly, and the AAA and AA-1 designations will be used for emergency purposes, where vital orders will take precedence above alloca-

tion. Since present AA allocation ratings have been automatically converted into AA-2 ratings, it is apparent that the other two new rating groups will hold precedence over allocations. However, it is reported that many holders of A-1-a ratings, upon learning of the issuance of the new ratings, were preparing to write to Washington requesting that they be given some of the higher ratings. It is understood that such requests will go largely unheeded.

FLATNESS AND SMOOTHNESS of Production Parts

YOUR production parts finished by the new Ultra-Lap machine method, to an optically flat surface . . . to specifications for flatness of one light band or less . . . to a smoothness as low as one micro-inch R.M.S. . . . any metal or material, or any combination thereof . . . much faster, more uniform than hand methods.

Machine designed for you or we shall be pleased to lap your parts on a job basis. Ultra-Lap machines and service used by aircraft and many other war-time industries.

Ultra-Lap MACHINE COMPANY
255 McDougall Ave. DETROIT, MICH.

Awaiting Wage Decision, Steel Union Calls Session
Pittsburgh

• • • United Steel Workers officials from "Little Steel" lodges early this week were summoned here for a Wednesday meeting to consider the forthcoming WLRB decision on wages and maintenance of membership. Early this week the meeting was considered unusual in that the men had been called to discuss a decision which had not yet been handed down when the conference was ordered. Some quarters had interpreted this meeting to mean that the union might have had some inside information on what the board was going to decide while other observers were equally certain that the called meeting with its attendant publicity came under the heading of "gentle pressure."

The WLRB was expected to hand down a decision this week, with unofficial reports suggesting a compromise on the wage question of from 5 to 6 cents an hour, with a maintenance of membership provision.

New Steel Corp. Film Will Be Shown Widely

• • • "Steel for Victory," a dramatic new film depicting the all-out-war production of United States Steel Corp. subsidiaries, will be exhibited in 2500 American motion picture theaters beginning July 15. Originally previewed and acclaimed at the most recent annual meeting of the U. S. Steel stockholders, the new picture has been approved by the Army and Navy.

The film portrays the vital role performed by U. S. Steel in the production of material for the armed forces of the United Nations.

Granik Aid to Nelson
Washington

• • • Theodore Granik, attorney and director of the American Forum of the Air, has been appointed special advisor to WPB Chairman Donald M. Nelson. Mr. Granik was formerly Assistant District Attorney of New York, and Counsel to the United States Housing Authority. He will serve without compensation.

NEWS OF INDUSTRY

T.C.I. Awards Medals For Long Service to 95

Birmingham

• • • Ninety-five employees of the Tennessee Coal, Iron & Railroad Co. were awarded service medals during the second quarter of 1942—five of them for having served 40 years with the company.

Seven had worked for the company 35 years, 21 for 30 years and 62 for 25 years. Their service records totaled 2,625 years, an average of 27.6 years a person.



Lincoln Electric Pins for Service Given 206 Employees

• • • The Lincoln Electric Co., Cleveland, has awarded service pins to 206 veteran employees whose tenure of service ranges from 10 to 35 years. The awards were made on Wednesday, July 1, at the factory.

Two recipients of citations whose service records extend over a period of 35 years were James F. Lincoln, president and general manager, and J. C. Lincoln, chairman of the board and treasurer. Service pins were presented to J. F. Lincoln by A. F. Davis, vice-president and secretary of the company, and to J. C. Lincoln by J. F. Lincoln, while employees presented the company president with a watch and chain and a scroll.

Colonial Broach Builds Plant

• • • Colonial Broach Co., Detroit, soon will occupy a new plant in Detroit designed to more than double its broach manufacturing capacity. Another new plant was erected by the company in the same locality about a year ago; this plant capacity is now being expanded.

The new plant, which is being completed in 90 days from start of work, provides more than twice the existing space for broach manufacture alone, with an additional 20 per cent of space for office and engineering space. After Colonial Broach moves to its new quarters, the original plant will be entirely occupied by Colonial Bushings, Inc., and New Method Steel Stamps, Inc.

Weld Inspection Chart Published by Lincoln Electric

Cleveland

• • • An arc welding inspection chart useful in maintaining proper quality of welds has just been published by the Lincoln Electric Co. The chart presents graphically the different types of welds obtained when the work is done normally, with normal voltage, current and speed, as compared with those obtained when these

factors are not normal. For each of seven conditions, the burn-off of electrode, penetration fusion (crater), appearance of bead and arc sound are charted in a table and illustrated photographically.

The inspection chart also illustrates the use of the "Fleet-Fillet" technique of welding developed by the Lincoln company. Another diagram shows how the speed of welding increases as the size of the electrode increases. The chart is available free of charge.



VULCAN CAR HEARTH FURNACE.....

For Heat Treating Alloy
Steel and Iron Castings

THE Car Hearth Furnace illustrated above incorporates the latest developments in VULCAN design and construction. Used for heat treating alloy steel and iron castings of various shapes and sizes, it is oil fired, top and bottom, permitting a temperature range from 800° F. to 1650° F. Four-zone automatic temperature and furnace pressure control insures highest efficiency in maintaining and recording the rate of heating, holding and cooling. Size of furnace: 40' long, 13' wide, 8' high.

Designed and built to meet specific requirements and conditions, VULCAN Furnaces have established an enviable reputation for uniform heating, accurate control, durability and economy of operation.

VULCAN design assures maximum efficiency and economy in Oil, Gas and Electric Furnaces for all heat treating operations. Consult VULCAN engineers regarding your specific problems.

VULCAN CORPORATION
NORTH 18TH & CHERRY STS., PHILADELPHIA, PA.



NEWS OF INDUSTRY

Plate Supply Called Critical, Other Scarce Materials Named

Washington

• • • WPB's Conversion and Substitution Branch of the Bureau of Industrial Conservation reports that steel plate supply is very critical. However, certain WPB material-men now say there need be no plate shortage if a sufficient amount of other flat rolled prod-

ucts is dislocated and slab routing is improved.

Metals classified by the branch as inadequate for war and essential civilian uses, and in many cases for war purposes alone, are:

Steel products—very critical—alloy and shell steel, steel plates, structural steel and steel piling, seamless steel tubing, 4 in. and under, wire rope, tin plate.

Steel products—critical—sheets and strip, wire, black and terneplate, rails and reinforcing steel, semi-finished steel and forgings, tool steel bars and pipe.

Metals—most critical—aluminum, brass,

bronze, copper, magnesium, nickel and nickel alloys, nickel scrap, tantalum, tin, tungsten, tungsten carbide, vanadium.

Metals—others—alloy iron, aluminum pigment, cadmium, chromium, cobalt, iridium, lithium, molybdenum, rhodium, wrought iron, and zinc.

Miscellaneous—most critical—coconut oil, jewel bearings and tung oil.

Miscellaneous—others—burlap, diamond dies, oiticica oil and palm kernel oil.

The following metals are deemed essential to war industries but the supply is not as limited:

Metals—aluminum scrap, aluminum, No. 12 remelt, antimony, bismuth, calcium, calcium silicon, columbium, ferrosilicon, ferrotitanium, iron, gray cast, malleable, mercury, pig iron and scrap, platinum, ruthenium, silicomanganese, silicon and alloys, silver, spiegeleisen, steel bessemer, chrome stainless, "national emergency", and scrap, zinc and low grades of uranium.

The following metals are available as substitutes:

Ferroboron, ferromanganese, gold, indium, lead, osmium, palladium and sodium.

Bucy Named New Chief of Protective Coatings Group

• • • E. H. Bucy, Noroton, Conn., has been appointed to head the Protective Coatings Section of WPB's Chemical Branch. Mr. Bucy, who joined WPB Jan. 7, has been head of the paint, varnish, lacquer and printing inks unit of the section. He had been with Atlas Powder Co. since 1934, and prior to that was chief chemist for Waukegan Chemical Co. Mr. Bucy replaces J. B. Davis, who has been lent to Brazil for development of babassu nut oil production.

Wells Martin, Chicago, former president of Martin Varnish Co., Chicago, will be assistant chief of the section.

War Department Awards 3 Construction Contracts

• • • The War Department announced July 8:

Award of a cost plus fixed fee contract to the Mellon Stuart Co., Pittsburgh, in connection with a depot in Pennsylvania, to cost in excess of \$3,000,000. Construction will be supervised by the Pittsburgh district office of the Corps of Engineers.

Award of a negotiated contract with the Shelton Construction Co. of Houston, in connection with an air force training school at Marfa, Texas, to cost in excess of \$3,000,000. Construction is under supervision of the Albuquerque, N. M., district office of the Corps of Engineers.

Award of a negotiated contract with Stevens Bros. and Miller-Hutchinson Co., Inc., New Orleans, and R. B. Potashnick of Cape Girardeau, Mo., in connection with an air force training school at Stuttgart, Ark., to cost approximately \$3,000,000. Construction will be supervised by the Little Rock district office of the Corps of Engineers.

Announcing

UDYGLU

**THE NEW, SYNTHETIC ADHESIVE
FOR METAL POLISHING**

UDYGLU is the new, different, synthetic adhesive which has all the advantages of glue plus a number of outstanding, additional qualities found only in UDYGLU.

UDYGLU holds abrasive grain like a vise, to cloth, metal or paper. It is easy to apply—use it right out of the can—brush it on. No pots or special equipment are necessary.

UDYGLU is flexible to a far greater degree than the ordinary wheel cements. Therefore, faster, better, more economical polishing results are obtained.

Once you use UDYGLU, you will be convinced of its superiority. Send in your order for a trial can. Do it NOW.

IT'S NEW • IT'S DIFFERENT • IT'S BETTER

THE UDYLITE CORPORATION

1651 E. Grand Blvd., Detroit, Mich.

Chicago
1943 Walnut Street.

Long Island City, N. Y.
11-16, 44th Drive

Cleveland
4408 Carnegie Ave.

NEWS OF INDUSTRY



INS Photo

A MAID AND A MILLION LIDS: Chris Cherney looks quite alone as she inspects this bumper crop of steel helmets at the B. F. McDonald plant on the west coast. The helmets are destined for distribution to Civilian Defense Corps throughout the country.

Reinforcing Bars Simplified

Washington

• • • The Division of Simplified Practice, Bureau of Standards, has announced a revision of the simplified list of cross-sectional areas for steel reinforcing bars, effective from June 15. The revision does away with the use of the $\frac{1}{2}$ -in. square for the duration of the war.

In addition to the simplified schedule R26-30, the new publication, R26-42, Steel Reinforcing Bars, will include a brief history of the development of the project.

Copies of the revised recommendation may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington.

Adopts Employee Life Insurance

• • • Union Forging Co., Endicott, N. Y., has acquired life insurance protection for its 169 employees. The employees will pay part of the premium, the remainder being assumed by Union Forging.

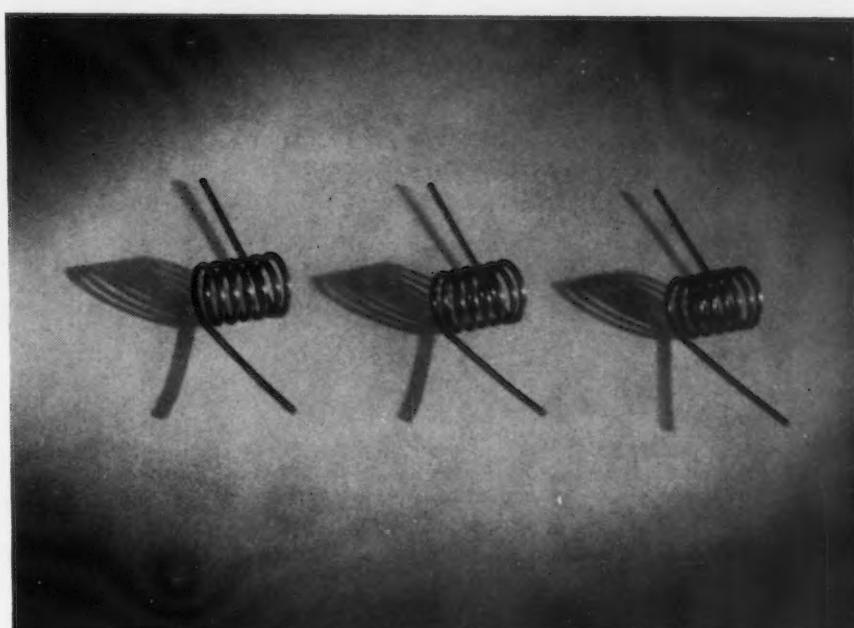
Concrete 'Sandbags' Devised

• • • To take the place of sandbag barricades for sabotage protection around public utility and industrial equipment, Celotex Corp., Chicago, has devised a wall of lightweight concrete blocks filled with sand, which several utility companies have already adopted. The concrete block wall is said to cost one-half to two-thirds less than sandbags and to last longer.

ALCOA Suggests Labor Plan

Cleveland

• • • Union officials, in an effort to end strikes, slow-downs and work holidays in the Aluminum Co. of America's plant, have proposed to the WPB a plan under which impartial umpires, approved by management and labor, will be named in the company's various plants to make final decisions on all labor grievances under existing contracts.



MARCHING INTO WAR!

Springs made on Torrington Spring Coilers are daily marching into war, in tanks, airplanes, jeeps, guns, bombs, and other weapons.

The needs of war are more easily met by professional springmakers who use Torrington Coilers, because of the extreme accuracy and high production speeds of which these machines are capable. Ask your supplier: "Will my springs be made on a Torrington Coiler?"

Complete specifications on both segment and clutch type coilers free by sending us your inquiry today.



THE **TORRINGTON**
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

NEWS OF INDUSTRY

Lorain Plant Making 5 Miles Of Pipe per Day for New Line

• • • Production of large diameter steel pipe for the new 550-mile petroleum line, extending from Longview, Texas, to a point near Salem, Ill., has begun under a government directive at the National Tube Co.'s Lorain, Ohio, plant at the specified delivery rate of almost five miles a day, it was announced July 9 by B. F. Harris,

president of the United States Steel subsidiary.

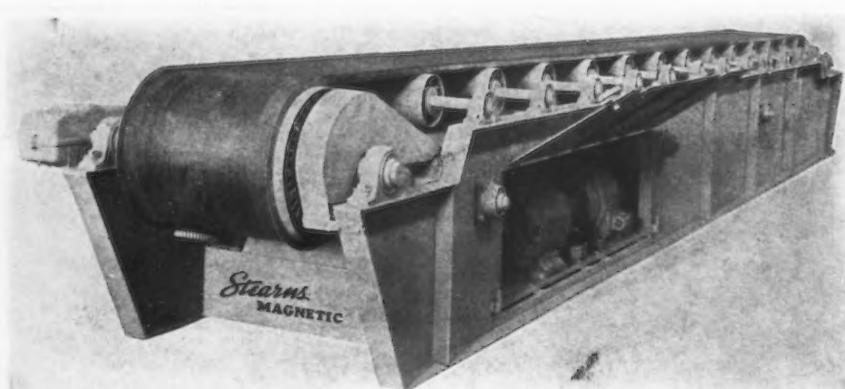
Destined for the world's largest oil-carrying line, the pipe is 24 in. in diameter and $\frac{3}{8}$ in. thick. The National Tube Co. has the only mill capable of turning out this larger size seamless pipe.

National Tube workmen are turning out approximately 1200 tons of the pipe daily, or enough to fill 40 railroad cars. At this rate of production the 137,500-ton

Urgent Request for Heat Treating Data

• • • To expedite vital war production, the WPB is seeking all available heat treating facilities which can be used to break the bottleneck existing in this field.

Idle furnace capacity should be reported to the Heat Treating Equipment Unit, War Production Board, Room 4520, Social Security Building, Washington.



METAL SALVAGE WITH Stearns MAGNETIC Separators

This Combination Picking Belt and Magnetic Pulley Separator is one of several economical, automatic, efficient methods offered for salvaging brass, aluminum and secondary metals from metallic refuse or junk.



THE STEARNS POWERFUL AIR-COOLED MAGNETIC PULLEY

Every plant official is or should be, interested in industrial salvage and reclamation of metals. Stearns Magnetic engineers have had many years of pioneering experience in practically and profitably applying magnetic separators to such problems...have been able to produce substantial savings in production costs.

Investigate Stearns Magnetic methods. Write for Bulletin 302.

SEPARATORS DRUMS ROLLS
CLUTCHES BRAKES
SPECIAL MAGNETS

Stearns
MAGNETIC MFG. CO.
635 S. 28th St. Milwaukee, Wis.

order is expected to be completed within approximately four months.

The pipe line, when completed, will deliver an estimated 300,000 barrels of oil daily for transshipment to the eastern seaboard, where a steady flow of oil is vital to the war effort.

6 Months' Shipments by U. S. Steel New Record

• • • Shipments of finished steel products by subsidiary companies of United States Steel Corp. for the month of June totaled 1,774,068 net tons, highest on record for that month.

The June shipments compare with 1,834,127 net tons in May, a decrease of 60,059 net tons, and with 1,668,637 net tons in June, 1941.

For the year 1942 to date, shipments were 10,503,507 net tons compared with 10,052,877 net tons in the comparable period of 1941, an increase of 450,630 net tons.

Total shipments during the second quarter and the six-month period ending June 30 were the highest in the corporation's history.

Lake Boat Sets New Record

Cleveland

• • • The Pittsburgh Steamship Co.'s ore boat, *Leon Frazer*, unloaded 16,514 gross tons of iron ore at Conneaut, smashing the all-time record for the largest ore cargo ever unloaded at a Lake Erie port. At the same time, the *Frazer* broke the speed record, making the distance from Duluth to Conneaut, 882 miles, in 66½ hr.

OPA Ceilings On Combat Items Aimed At Costs Before April 27

••• A formula for ceilings on prices of military combat items, which OPA has been drawing up for several months, will take into account overhead rates and pay scales as they were in effect before April 27, Leon Henderson disclosed last week before a Senate appropriations subcommittee.

The price administrator asserted he had served notice on the Army and Navy "and others" that he intended to hold government agencies to a section of the Price Control Act which directed them to work with him for fair wages and stabilized prices.

"We have taken the position with several industries," he said, "that we will not recognize as a basis for a price increase any increased wages that had not been negotiated before the statement of the President's policy on April 27."

Henderson disclosed that he has asked WPB to call a conference of labor and industry in the aircraft industry in an attempt to obtain wage stabilization, similar to that negotiated in shipbuilding.

Later in the week, when Congress had voted him only \$120,000,000, well below his budget request of \$210,000,000, Henderson issued a statement indicating that repeal of the General Maximum Price Regulation might be necessary. He also attacked a rider to the appropriations bill which forbids the use of OPA of subsidies for keeping down the cost of living.

OPA disapproval of the 50 to 60 per cent wage increase proposed by aircraft unions was strongly voiced by Richard Gilbert, deputy OPA administrator, at Los Angeles on Monday of this week before the Federal aircraft wage stabilization conference.

Profits of the airplane industry created by war demands of the Government are not normal and are not labor's to demand, he said, pointed out that average wages in the aircraft industry are above the general level. He continued:

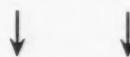
"The OPA regards the following factors for purposes of this conference as pertinent in the interpretation of this term.

"1. Differences in wages between comparable jobs in the same plant.

"2. Differences in wages between comparable work in different industries in the same region.

"3. Geographical differences in the cost of living.

"4. Variations in the condition of work including housing and other community facilities."



Adjustment of Ceiling Prices Assisted by OPA Amendment

••• Provisions under which producers, manufacturers, and wholesalers can apply directly to OPA for adjustment of their ceiling prices as established under the General Maximum Price Regulation are contained in Amendment 10 to the regulation, announced July 9 and effective July 14.

The effect of the amendment is to set up machinery for adjustment of all hardship cases arising under the General Maximum Regulation as long as the adjustment can be made without causing an increase in the general level of prices. Applications are to be

made in accordance with the OPA Procedural Regulations.

Amendment No. 10 rewrites Section 18 of the General Maximum Price Regulation and permits the OPA to issue an order for adjustment of ceiling prices under these three circumstances:

1. For retailer who shows that his maximum price is abnormally low in relation to his competitors and causes him substantial hardship. (This provision contains no major change from the original provision in the regulation).

2. For any seller other than a retailer (manufacturers, wholesalers, etc.) who shows that (a) a maximum price is abnormally low in relation to his competitors and causes him substantial hardship, and (b) that the adjusted price will not cause or threaten to cause an increase in the level of retail prices.

3. For all sellers, including retailers, seeking relief on any other basis whose case is typical of other sellers suffering similar hardship and for whom the granting of relief will not jeopardize the purposes of the price regulation to eliminate the danger of inflation.

Formerly, the General Regulation allowed applications for adjustment of out-of-line prices only by retailers.

The amendment also permits "any duly authorized officer" of

"PIE WAGON": This mobile display shows Hyatt Bearings Division employees a complete set of bearings used in Pratt & Whitney and Allison aircraft engines and some of the planes powered by these motors. Two similar wagons carry tank bearings, with diagrams of their positions. "Pie Wagons" remain several days in each department.



PRICES

OPA to order adjustments in ceiling prices. This opens the way for further decentralization of the administration of price regulation by permitting the Price Administrator to designate regional officials to make adjustments in local cases. Already, regional offices are permitted to make adjustments for retailers in purely localized cases.

The amendment applies to all other maximum price regulations which have Section 18 of the General Regulation incorporated in their provisions.

The provision in the amendment, permitting adjustment in cases other than hardship caused by prices out of line with those of competitors, has been included to deal with other situations which cannot be defined in advance. This provision throws upon the applicant the necessity of showing not only that he is subjected to hardship but that his situation is one of a type for which there is no other form of relief, and that the hardship can be relieved without impairing the policy of the OPA to eliminate the danger of inflation.

While the order for adjustment in such cases will deal directly only with the individual applicant's case, each order will be based on a study of related cases and upon a general principle applicable to similar cases.

Any person seeking relief, for which no provision is made in the amendment may present the spe-

cial circumstances of his case in an application for an order of adjustment. Such an application shall be filed in accordance with Procedural Regulation No. 1 and shall set forth the facts relating to the hardship to which such maximum price subjects the applicant together with a statement of the reasons why he believes that the granting of relief in his case and in all like cases will not defeat or impair the policy of the Emergency Price Control Act of 1942 and of this General Maximum Price Regulation to eliminate the danger of inflation.



Hits Tax on Freight Charges

• • • A 5 per cent tax on freight and express charges would endanger the nation's price controls and push the cost of living higher, warned Price Administrator Henderson in Washington July 9.

The tax was tentatively approved by the Ways and Means Committee of the House. Henderson's warning was given in a letter he sent to Representative Doughton, of North Carolina, chairman of the committee.

The proposed tax, estimated to raise \$292,000,000 in revenue, would weigh most heavily against mine and farm products in which transportation figures as a heavy cost element, the OPA Administrator said.

It also would discriminate

against firms remote from manufacturing centers, he added.

Further, Mr. Henderson said, the ad valorem levy was likely to discriminate against manufacturers in favor of distributors because the materials bought by manufacturers cannot be traced through to the final product, whereas the distributor generally sells the same commodity that he buys. In the case of many commodities the increase would be added directly to the price and passed on to the consumer at retail, he said.



Profit Control Criticized

• • • The use of price controls for limiting profits was criticized July 9 at New York by C. Donald Dallas, chairman of the price control committee of the National Association of Manufacturers.

He explained that he did not think Leon Henderson, price administrator, "is aiming at corporate profit control, but I think some of his subordinates are, and that some members of Congress and other officials are involved in the attempt."

Mr. Dallas, president of Revere Copper & Brass Inc., pointed out that to limit profits by price control is a political rather than a price control move. He stressed the necessity of building up reserves for necessary post-war industrial activities.



Acid Schedule Coming

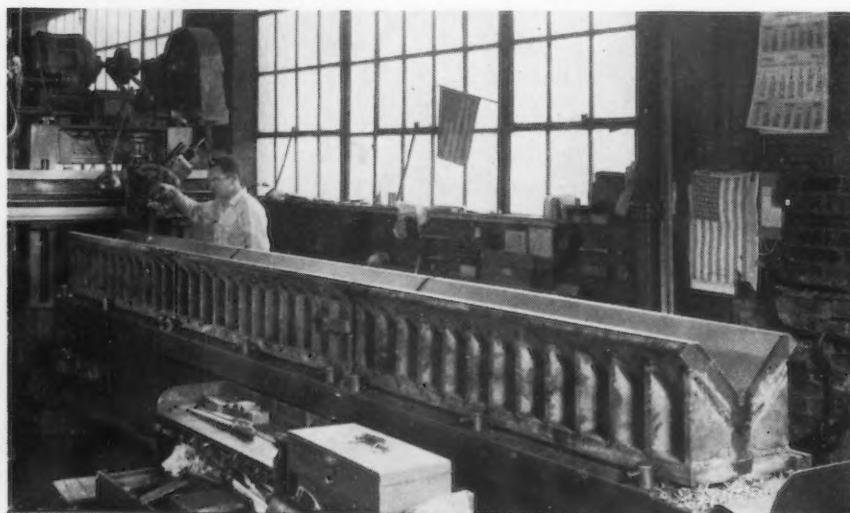
• • • Imported cresylic acid, used for the production of plastics and in the mining industry, will be put under a price regulation, according to OPA. The contemplated maximum prices will be based on a price of about \$70 per gallon, f.o.b. English works, which approximates the English domestic price.



Zinc Oxide Prices

• • • An amendment (No. 1) to Price Regulation No. 166 on zinc oxides permits a maximum price of 7c. per lb. on sales of zinc oxides containing 35 per cent or more lead between May 11 and June 22. The amendment was issued July 9. It changes the ef-

PLATE BENDING DIES: These three steel dies being machined in the Dreis & Krump Mfg. Co. plant at Chicago, were built up of welded plate sections with flame-hardened inserts. Such dies, used in bending plate up to 1-in. thick, were formerly made of cast iron.



PRICES

fective date of Schedule 166 from June 22 to May 11.



Aid to Bidder Denied

• • • An appeal by a successful bidder, on an FSA proposal for ice chests, to OPA for price action under GMPR has been denied although the company will lose money under terms of its bid. The action indicates OPA will not be an avenue of relief for contractors wishing to abrogate contractual relations.



Canal Zone Exempted

• • • All commodities sold and delivered in the Panama Canal Zone are exempt from coverage by any OPA price regulation, it was announced by OPA July 10. Virtually all commodities sold in the zone are handled by U. S. Government owned corporations operating on an average markup of 3 per cent. The new exemption is covered in Supplementary Order 8 to the General Maximum Price Regulation.



Chrome Ore Byproduct

• • • A maximum price of \$15 per ton, f.o.b. plant, has been set by OPA for a dried, finely pulverized, airfloated chromium containing residue remaining after the roasting of chromium ore in the production of sodium chromate after extraction of the sodium chromate, when packed in paper bags. The Martin Dennis Co. of Newark, N. J., developed the product, which will be used in color glass. The product could not be priced under the General Maximum Regulation.



Lead Scrap Prices

• • • Sellers of lead scrap materials have granted permission to charge buyers for the copper contained in terminals of submarine batteries.

Permission is granted in Amendment No. 3 to Revised Price schedule No. 70 on lead scrap materials. The amendment becomes effective July 13, 1942.

The change provides that a charge may be imposed for the

copper content of terminals in addition to the maximum prices allowed by Revised Price Schedule No. 70 for the lead and antimony content of the scrap. The maximum price permitted for the copper is that provided by Revised Price Schedule No. 20 as amended on copper scrap and copper alloy scrap.

Amendment No. 3 also provides that maximum prices for the copper content of lead-covered copper

cable shall be determined in accordance with Revised Price Schedule No. 20 as amended.

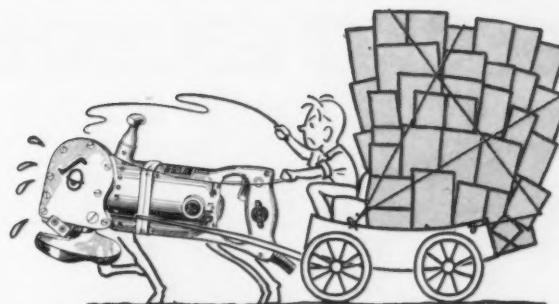


Fair Trade Law Statement

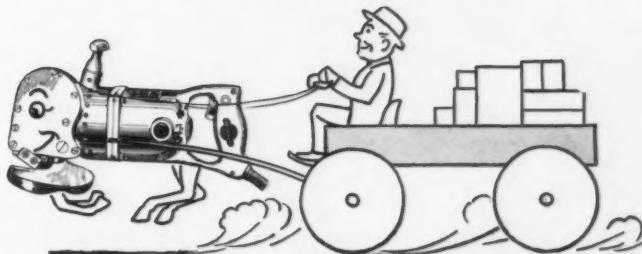
• • • On the subject of fair trade laws, the following statement was issued July 11 by David Ginsburg, general counsel of OPA:

"It is clear that no seller sub-

Portable Electric Tools are Hard to Replace



Overloading Risks Trouble - Shortens Service Life



Treat 'em Right and Keep 'em on the Job!

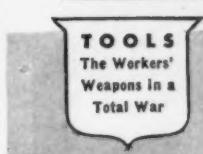
Stanley Electric Tools are designed and built to last a long time. You can get all this long service, so necessary today, - and save money on repairs, if you follow the simple instructions for maintenance packed with the tool. We'll gladly send new instructions if you need them.

If parts wear out, don't discard the tool. Have it repaired or rebuilt. Stanley is maintaining its usual repair service, and is keeping replacement parts available during the emergency. Stanley Electric Tool Division, The Stanley Works, New Britain, Connecticut.

DON'T OVERLOAD

Use a Unishear of the proper capacity for the material to be cut. Rated capacities are printed on the name plates. Most overloading is caused by dull blades, which put a strain on

the motor and produce poor cuts. A Unishear will cut faster, use less current, and operate more smoothly if blades are kept properly sharpened at all times.



STANLEY
Electric Tools



PRICES

ject to the General Maximum Price Regulation may sell at a price higher than the price established by the OPA. Cases may arise, however, in which this maximum is less than the minimum price established under a state fair trade contract.

"It is not the view of this office, in cases in which there have been substantially uniform observances within the community of the state

fair trade price, that the General Maximum Price Regulation authorizes a seller to sell below that price. Where the price established by fair trade contract has been generally observed during March and the violations represent the abnormal situation, enforcement of the fair trade contract would not be regarded by this office as substantially interfering with the purpose of the

General Maximum Price Regulation or the Emergency Price Control Act."



Live Steam Under GMPR

• • • Recent questions and answers on the General Maximum Price Regulation include:

1. Q. Is live steam covered by the General Maximum Price Regulation?

A. Live steam is a commodity within the meaning of the Emergency Price Control Act of 1942. The rates charged for it by a private producer are subject to the General Maximum Price Regulation. However, if the producer is a public utility offering its steam facilities to the public generally, the rates charged by it are exempt, because of the provisions in the act that rates charged by public utilities may not be regulated.

2. Q. Are prices of manually operated stirrup pumps used to quench incendiary bombs covered by the General Maximum Price Regulation?

A. Yes.

3. Q. Does the General Maximum Price Regulation apply to patent leases?

A. No.



Fluorspar Price Action

• • • A maximum price for fluorspar has been established for Continental Chemical & Ore Co., Inc., Silver City, N.M., at \$27.16 per ton, f.o.b. Silver City, for acid grade, with 97.2 per cent to 97.5 per cent plus calcium fluoride and a maximum of 1 per cent silica.

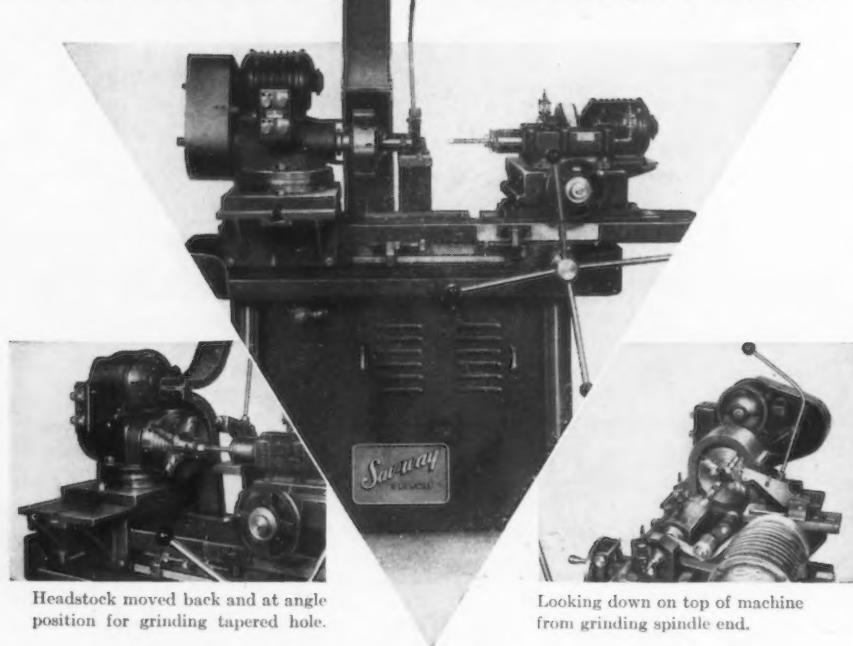
The OPA based its action on delivered prices of similar grades at Wilmington, Del. The action, taken in Order 3 to Price Schedule 126, places all deliveries at Wilmington on an equal basis at \$40.45 per ton.



Miscellaneous

• • • The Boston Stove Foundry Co., Reading, Mass., has been authorized to manufacture two new stove models, designed to effect a conservation of fuel oil, by order No. 10 under Revised Price Sched-

Sav-way MULTI-PURPOSE INTERNAL GRINDER



Headstock moved back and at angle position for grinding tapered hole.

Looking down on top of machine from grinding spindle end.

Offers greater flexibility

... a precision grinder, designed and built by engineers with years of practical experience to guide them . . . has a headstock traverse of 6" . . . grinds holes $\frac{1}{4}$ " to 18" in diameter . . . holes up to 9" deep, straight or tapered . . . entire headstock may be moved at right angle to wheel traverse, by merely loosening two conveniently located nuts . . . worm compensating device permits grinding wheel head adjustment to .0001 . . . sturdy construction throughout . . . full specifications, delivery time and price on request.

Distributors throughout the U. S. and Canada to serve you.

Sav-way TOOL AND MACHINING CO.
13834 JOS. CAMPBELL AVE. DETROIT, MICHIGAN

TRANSPORTATION NEWS

ule No. 64 (Domestic Cooking and Heating Stoves). By Order No. 9 under the schedule, prices are set for a new oil range sold by A. J. Lindenmann & Hoverson Co., Milwaukee.

A new device for applying paint, developed by Glidden Co., Cleveland, as a substitute for brushes, lacked price history. OPA has approved the company's submitted figures for manufacturer's price level as being in line with comparable products. Wholesale and retail prices will have to be approved in separate actions. The maximum prices suggested by the company for the applicator which consists of a thin metal cylinder, were 85 c. per applicator and sleeve and 40 c. for a replacement sleeve in sales to dealers. They were approved by OPA in Order No. 27 under the General Maximum Price Regulation.

Ocean Shipments Under Set Procedure by New Rule

Washington

• • • The procedure under which commercial cargo will be booked for ocean shipment to destinations in other American republics was established jointly by the State Department, Board of Economic Warfare, War Shipping Administration, and the Office of Defense Transportation. Rulings covering carrier movement of cargo into United States ports for off-shore shipments will be issued shortly by ODT.

Beginning immediately, exporters will have to file with the Board of Economic Warfare five copies of a prescribed application for freight space in vessels departing on and after Aug. 15 for shipments weighing 2240 lb. or more. These applications will be considered only when goods are ready for shipment or will be ready to move from the factory or warehouse within three weeks after the application for space is submitted. This procedure will be followed for all water-borne dry commercial cargo including goods covered by individual license, general license, or any other type of export license issued by the BEW. When exported under other licenses, goods cannot be given space until the license has been

granted. Liquid products moving by tanker in bulk are not included in this plan.

With limitations of available ship tonnage, the BEW will transmit to the War Shipping Administration such applications as are determined necessary to meet essential requirements of the importing countries in accordance with the desires expressed by their government as well as the

requirements of those projects producing materials of strategic importance to the war program.

It having been decided from what ports and at what period freight space will be available, the War Shipping Administration will return to the exporter one copy of the notice bearing the ODT unit number authorizing transportation to the port. All bookings for particular ships will

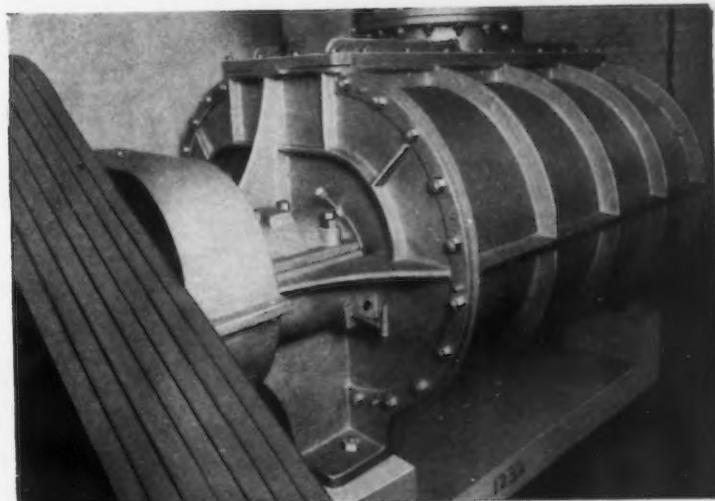
For BETTER Iron and MORE of it—

Top production of iron of good quality is aided by maintaining the correct coke bed through entire heat, so that oxygen is completely burned and oxidation reduced to a minimum.

Roots-Connersville Positive Displacement Blowers are preferred equipment throughout the metal working field—because they deliver an accurately measured volume of air to the coke bed at constant rate, regardless of resistance within the cupola. You benefit through lower scrap losses, savings in coke, less maintenance, and decreased power costs.

Lengthening deliveries, due to war-time demands, should bring consideration now of future needs.

ROOTS-CONNERSVILLE BLOWER CORP.
207 OHIO AVENUE
CONNERSVILLE, INDIANA



Roots
CONNERSVILLE
SINCE 1854

Positive Displacement
CUPOLA BLOWERS

Cupola Blower installed in large mid-west foundry.
9,900 CFM; 240 RPM; V-belt drive from motor.

TRANSPORTATION NEWS

be confirmed subsequently by the steamship operators.

Two points were emphasized: (1) The application form in five copies must be filed with the Board of Economic Warfare not only for goods at an interior point but also for goods at seaboard; and (2) these forms must be filed for goods shipped under individual, general, or any other type of license. Shipments not exceeding

2240 lb. covered by a valid export license may be booked by steamship operators within rigid restrictions as to aggregate amount per ship, in accordance with BEW priority ratings.

Bookings of cargo will continue to be made by ship operators on direct application by shippers for space, but subject to final approval by the Cargo Clearance Section, in New York, set up by

the War Shipping Administration in conjunction with the British Ministry of War Transport. Branch offices of the Cargo Clearance Section will operate in other ports as necessary.



Motor Carriers

• • • The establishment of "joint information offices" by ODT throughout the country to aid motor carriers in stepping up the efficiency of their operations was ordered. The plan is designed to make it easier for common, contract, and private carriers to comply with ODT general orders for war time conservation of trucks and tires.

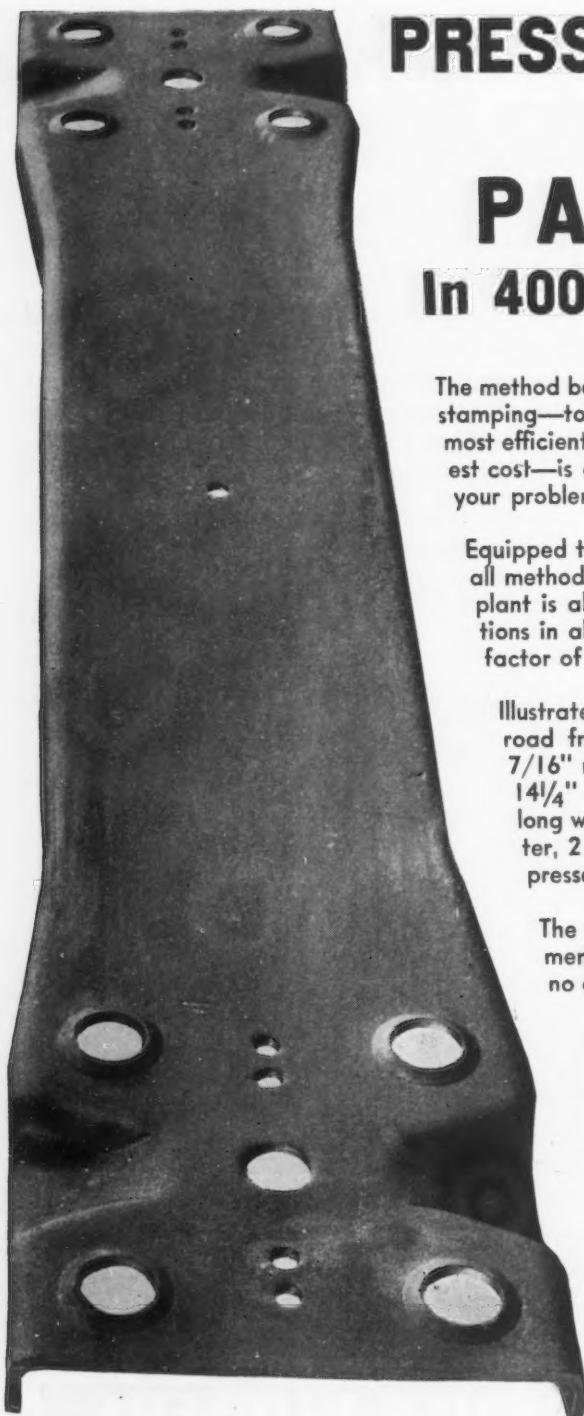
Each joint information office will be governed by a committee or board to be selected by the carriers concerned, on ODT approval. These offices will assist carriers in working out arrangements for compliance with ODT truck conservation orders by obtaining from and relaying to carriers such information as equipment available and goods awaiting shipment in their areas. These offices will have no power to fix compensation for the interchange of property or the rental price of vehicles, nor to lease equipment or assign traffic to specific carriers.

Cost of establishing and maintaining these joint information offices is to be shared equitably by the participating carriers. However, no carrier will be required to pay a membership fee to avail himself of the services of the office but a charge may be made for specific services rendered. The office is required by the order, general order ODT No. 13, to give out information as to available equipment and traffic to any carrier requesting such service. Applications for permission to establish joint information offices must be made on blanks to be provided by the Division of Motor Transport.



Carloadings

• • • Because of heavier loading and longer haul of railroad cars, revenue tonnage and revenue ton mileage figures now provide a more accurate measurement of the



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16 $\frac{5}{8}$ " wide at ends, 14 $\frac{1}{4}$ " wide at center and 9 $\frac{1}{4}$ " long with flanges 3 $\frac{3}{8}$ " high at center, 2 $\frac{3}{16}$ " high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

PARISH
PRESSED STEEL CO.

READING, PENNA.

Pacific Coast Representative
F. Somers Petersen Co.,
57 California St.,
San Francisco, California

We have turned our facilities over entirely to the manufacture of various products required by the United States Government and American Railroads.

TRANSPORTATION NEWS

volume of railroad freight traffic than carloadings, ODT said last week. Total carloadings for the first half of 1942 show a gain of only 6.7 per cent over last year's, but all classes of freight, with the exception of less than carload shipments, increased 13 per cent. L.c.l. shipments declined 17.8 per cent due to ODT's General Order No. 1, and used 3,194,811 cars, compared with 3,885,072 cars for the first half of 1941.

During the quarter ended March 31, the major railroads moved 576,211,670 revenue tons, compared with 478,521,196 tons in the first quarter of 1941, a 20.4 per cent increase, according to the Interstate Commerce Commission. Revenue ton-miles rose from 101,375,401,000 the first quarter of last year to 132,028,605,000 this year a gain of 30.2 per cent.

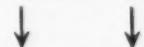
On at least 60 per cent of the 121 major railroads by the end of May approximately 20 per cent of all merchandise car loads had already reached the 10-ton limit to be established by order Sept. 1, and almost 50 per cent had attained the 8-ton loading, ordered effective July 1. On some of the reporting roads, long haul merchandise showed the greatest loading improvement. It is expected that by Sept. 1 some of the larger roads will show a 12 or 14-ton average loading.

Packaging Standards

• • • Two new agencies to deal with container and packaging problems of war supplies have been set up by WPB's Division of Purchases. The Container Coordination Section of the division will attempt to insure against waste of shipping space by coordinating container and packaging standards, coordinating efforts of other agencies to reduce shipping space by improving containers and methods, and training a staff of inspectors to report instances of waste space and poorly designed containers.

A Container Coordinating Committee, including representatives of the Army, Navy, and other procurement agencies, will establish specifications, prepare uniform procedure for moisture and corrosion protection, prepare designs, consider cases of conflicting interests in container production, and

make recommendations in case of packaging material shortages.



Coastwise Colliers Banned For Short-Haul Deliveries

Washington

• • • A general order, ODT No. 15, was issued prohibiting coastwise colliers from transporting coal from Hampton Roads area, Va., to any New England port

west of Stonington, Conn., except as authorized by special or general permit. The order, effective July 22, is designed to concentrate all self-propelled coal ships of 1000 tons registry or over on the long-haul coal movements from the Hampton Roads area to the farther New England ports, which cannot under present conditions be efficiently served by barge lines.

The effect of the order is ex-

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TRANSPORTATION NEWS

pected to be a greater utilization of barges for the short-haul coal cargoes along the inland waterway to New York and nearby Connecticut. Every person owning, controlling, or operating vessels that are engaged in coal transportation on the Atlantic Ocean and connecting waters are required to prepare and maintain such records and make such reports as the ODT may hereafter require and must keep such re-

ords available for convenient inspection.



Port Storage

• • • A Storage Control Section has been established in ODT's division of storage to maintain a continuous check on storage facilities at ocean ports and to assure adequate space for war materials consigned to overseas

destinations. Robert C. King, of Washington, D. C., has been appointed chief of the new section.



Motor Truck Conservation

• • • O. D. T. director, Joseph B. Eastman, sent letters to the governors of the 48 states and to trade associations, veterans' organizations, service clubs, the U. S. Chamber of Commerce and national and state trucking organizations urging the conservation of the nation's 5,000,000 motor trucks, and support of the new U. S. Truck Conservation Corps which has been set up by ODT. Truck owners expressing willingness to participate in the program will be entitled to display a red, white and blue insignia on the right-hand cab door of their trucks. A 16-page booklet, entitled "America's Trucks . . . Keep 'em Rolling," has been prepared for wide distribution, giving the essential details of a preventive maintenance program.



Transportation Survey

• • • Transit companies throughout the country have been ordered to give an accounting of steps taken to carry out ODT conservation policies and of the results obtained through these efforts. These reports must be submitted to the Division of Local Transport not later than July 24. Information required goes beyond ODT's statement of April 17 that street car and bus companies are expected to describe any and all steps taken to save equipment, especially rubber-tired vehicles, and improve the efficiency of their operations. The additional information sought touches on such matters as the restoration of old vehicles into service, rearrangement of interiors to increase passenger capacity, use of second-hand equipment, and other transit-saving expedients. Moreover, operators are expected to show what has been done to encourage patrons to walk to and from work, steps taken to insure more efficient use of private automobiles, and a complete equipment inventory with the number of vehicles of all types in service on a typical day in May.

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HOT DIE STEEL

E-71 is a special composition of Mogul Molybdenum High Speed Steel which has been developed for use in hot dies for such operations as extruding and coining steel parts. It has excellent resistance to washing, heat checking, sinking and abrasive wear.

Mogul E-71 Hot Die Steel is hardened at a temperature of about 2240° F. and has a Rockwell Hardness of C-56 when hardened at 1100° F.

Production tests proved its superiority over dies made of well-known high tungsten hot die steels. Our representatives will be glad to discuss your hot work problems with you.

There is a Jessop steel for every tool and die requirement.

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Machinery Set Up To Free Frozen Material Stocks

Washington

• • • **Business concerns** who have vast stocks of material which cannot be moved freely into industrial channels because it is frozen under

existing war regulations will be afforded some relief by priorities regulation No. 13. In effect, this order sets up new and uniform rules governing the sale of idle inventories of specific types and re-

moves such specified sales from the existing regulations which now affect the normal flow of such material.

Existing limitation orders contain various provisions which restrict disposal of inventories frozen as a result of their terms. In some cases, certain permitted types of sale were listed in the original order, but in other cases no sale

(TURN TO PAGE 109, PLEASE)

How To Dispose of Frozen Metal Stocks

Schedule A, the metals section of which is shown here, relates only to special sales made under priorities regulation No. 13. Purchasers of material through special sales must comply with all inventory, quota, and use restrictions imposed by all other orders and regulations.

When an alloyed or a physically or chemically compounded material is shown in this table, the conditions that govern the sale are those shown for the alloy or compound, and not those shown for the constituent elements or parts. For example, stainless steel may be sold only as shown for the War Material "Stainless Steel" and not those shown for "Chromium" or "Nickel" or "Steel." Such metals as are not listed and contain a significant amount of more than one war material may be sold only to a person to whom all such contained war materials may be sold.

The word "NO" appearing in a column means that a holder may not sell the particular material to any person in the class to which the column applies unless the sale is otherwise permitted by the regulations. The letters "PR" mean preference rating and indicate that the holder may sell the particular material to any person in the class to which the column applies, but *only* provided the prospective buyer places with the holder an order for the material bearing a duly applied or extended preference rating equal to or higher than the rating shown accompanying the letters "PR."

The letters "W.O.P." mean "without preference rating" and where they appear in a column, the holder of a metal may sell that particular metal to any person in the class to which that column applies without any preference rating from the buyer. The letter "X" means "not applicable."

War material	Classes of buyers to whom special sales of war materials may be made in accordance with this schedule, subject to paragraph (d) (2) of this regulation						Remarks	
	Producers as defined in this regulation		Reprocessors who are authorized to buy	Wholesale dealers in the material in the form held by holder	Scrap dealers who are authorized to buy	(7)		
	Producers who produce material in the form in which it was purchased by holder	Other producers permitted to buy for an authorized use						
(1)	(2)	(3)	(4)	(5)	(6)		(7)	
PART I—METALS								
Alloy Steel (see Steels).								
Aluminum:								
Aluminum.....	W. O. P.....	No.....	W. O. P.*.....	W. O. P.*.....	No.....		*Only to approved reprocessors and wholesale dealers. Lists available at WPB offices.	
Powder and Paste.....	W. O. P.....	No.....	X.....	W. O. P.....	W. O. P.....			
Pigments and Paint (see Chemicals Section).								
Scrap*.....	W. O. P.....	No.....	W. O. P.**.....	X.....	W. O. P.**.....		*Subject to limitations in M-1-d on sale of certain segregated scrap.	
Scrap*.....							**Only to approved reprocessors and scrap dealers. Lists available at WPB offices.	
Antimony:								
Antimony.....	W. O. P.....	No.....	No.....	W. O. P.....	No.....			
Chemicals (see Chemicals Section).								
Antimonial Lead (see Lead).								
Scrap.....	W. O. P.....	No.....	W. O. P.....	X.....	W. O. P.....			
Babbitt (see Tin).								
Beryllium (including scrap).....	W. O. P.....	No.....	No.....	W. O. P.....	W. O. P.**.....		*Only when sold as scrap.	
Brass (see Copper).								
Brass Mill Scrap (see Copper).								
Brass and Wire Mill Products (see Copper).								
Bronze (see Copper).								
Cadmium:								
Cadmium.....	No.....	No.....	No.....	W. O. P.....	No.....			
Chemicals (see Chemicals Sections).								
Scrap.....	No.....	No.....	No.....	X.....	W. O. P.....			
Carbon Steel (see Steels).								
Cast Iron Products (see Iron).								
Chromium:								
Chromium.....	W. O. P.....	PR A-1-k.....	X.....	W. O. P.....	No.....			
Chemicals (see Chemicals Section).								
Scrap.....	W. O. P.....	PR A-1-k.....	W. O. P.....	X.....	W. O. P.....			
Cobalt:								
Cobalt (including scrap).....	W. O. P.....	No.....	X.....	W. O. P.....	W. O. P.**.....		*Only when sold as scrap.	
Chemicals (see Chemicals Section).								

P R I O R I T I E S

War material	Classes of buyers to whom special sales of war materials may be made in accordance with this schedule, subject to paragraph (d) (2) of this regulation					Remarks	
	Producers as defined in this regulation		Reprocessors who are authorized to buy	Wholesale dealers in the material in the form held by holder	Scrap dealers who are authorized to buy		
	Producers who produce material in the form in which it was purchased by holder	Other producers permitted to buy for an authorized use					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Copper:							
Copper Ingots and Refinery Shapes	W. O. P.	No	X	W. O. P.*	No		
Copper-Base Alloy Ingots (50 per cent copper by weight)	W. O. P.	No	X	W. O. P.*	No	*Only to persons holding allocation certificates or specific authorization to buy.	
Brass and Wire Mill Products	W. O. P.	PR A-1-k	X	W. O. P.*	No		
Copper and Brass Foundry Products	W. O. P.	PR A-1-k	X	W. O. P.*	No		
Copper and Copper-Base Alloy Scrap	W. O. P.	No	X	X	W. O. P.		
Brass Mill Scrap	W. O. P.*	No	X	X	W. O. P.	*Only to Brass Mills.	
Ferroalloys*						*May be sold as provided for principal non-ferrous element.	
Iron:							
Inconel (see Nickel)	W. O. P.	W. O. P.*	W. O. P.	W. O. P.	W. O. P.**	*Cannot be used for jewelry. **Only when sold as scrap.	
Iridium (including scrap)							
Alloy Iron Castings*	W. O. P.	PR A-1-k	W. O. P.	X	W. O. P.	*Does not include materials commonly known as "ferroalloys", listed in Priorities Regulation No. 11 as "ferro-alloying agents".	
Pig Iron:							
Wrought Iron	W. O. P.	No	No	No	No		
Cast Iron Products	W. O. P.	PR A-9	W. O. P.	W. O. P.	No		
Alloy Iron Scrap	W. O. P.	PR A-9	W. O. P.	W. O. P.	No		
Other Iron Scrap	W. O. P.	No	W. O. P.	X	W. O. P.		
Lead:							
Lead	W. O. P.	W. O. P.	W. O. P.	W. O. P.	No		
Antimonial Lead	W. O. P.	W. O. P.	W. O. P.	W. O. P.	No		
Scrap	W. O. P.	W. O. P.	W. O. P.	X	W. O. P.		
Magnesium (including scrap)	W. O. P.*	No	W. O. P.*	W. O. P.	No	*Only to approved reprocessors. Lists available at WPB offices.	
Mercury:							
Mercury	W. O. P.	W. O. P.	W. O. P.	W. O. P.	W. O. P.		
Mercury Chemicals (see Chemicals Section)							
Molybdenum:							
Molybdenum (including scrap)	W. O. P.	No	No	W. O. P.	W. O. P.*	*Only when sold as scrap.	
Chemicals (see Chemicals Section)							
Monel (see Nickel):							
Nickel:							
Nickel (including Monel and Inconel)	W. O. P.	PR A-1-k	No	W. O. P.	No		
Solutions and Salts (see Chemicals Section)							
Scrap	W. O. P.	PR A-1-k	W. O. P.	X	W. O. P.		
Nickel Steel (see Steels)							
Pig Iron (see Iron):							
Platinum:							
Platinum (including scrap)	W. O. P.	W. O. P.	W. O. P.	W. O. P.	W. O. P.*	*Only when sold as scrap.	
Chemicals (see Chemicals Section)							
Rhodium (including scrap)	W. O. P.	W. O. P.*	W. O. P.	W. O. P.	W. O. P.**	*Cannot be used for jewelry. **Only when sold as scrap.	
Solder (see Tin Solder):							
Stainless Steel (see Steels):							
Steels:							
Carbon Steel in any single lot over 5 short tons.*	W. O. P.	No	No	No	No	*Holder shall consider as a single lot all steel of the same size and specification at one location.	
Carbon Steel except any lot over 5 short tons:							
Plates*	W. O. P.	PR A-1-a	No	W. O. P.	No	*As defined in M-21-c.	
Rails	No	No	No	No	No		
Structural	W. O. P.	PR A-1-a	No	W. O. P.	No		
Carbon Tool Steel	W. O. P.	PR A-1-a	No	W. O. P.	No		
Other Carbon Steel	W. O. P.	PR A-2	W. O. P.	W. O. P.	No		
Carbon Steel Scrap in any quantity	W. O. P.	W. O. P.	W. O. P.	X	W. O. P.		
Alloy Steel* in any single lot over 2,000 lb.**	W. O. P.	No	No	No	No	*General definition M-21-a. **Holder shall consider as a single lot all steel of the same size and specification at one location.	
Alloy Steel* except any lot over 2,000 lb.:							
Plates*	W. O. P.	PR A-1-a	No	W. O. P.	No	*General definition M-21-a.	
Stainless Steel*	W. O. P.	PR A-1-a	No	W. O. P.	No	*As defined in M-21-c.	
Tool Steel	W. O. P.	PR A-1-a	No	W. O. P.	No	*As defined in M-21-d.	
Other Alloy Steel	W. O. P.	PR A-1-a	No	W. O. P.	No		
Alloy Steel Scrap in any quantity	W. O. P.	No	No	X	W. O. P.		
Tantalum (including scrap)	W. O. P.	No	X	W. O. P.	W. O. P.*	*Only when sold as scrap.	
Terne Plate	W. O. P.	PR A-10	W. O. P.	W. O. P.	No		
Terne Plate Scrap	W. O. P.	No	W. O. P.	X	W. O. P.		
Tin:							
Tin (including scrap)	No	No	No	No	W. O. P.*	*Only when sold as scrap.	
Babbitt	W. O. P.	PR A-9	W. O. P.	W. O. P.	W. O. P.		
Tin Solder	W. O. P.	PR A-9	W. O. P.	W. O. P.	W. O. P.		
Chemicals (see Chemicals Section)							
Tin Plate:							
Tin Plate Scrap	W. O. P.	PR A-10	W. O. P.	W. O. P.	No	*Subject to limitations of M-24-a.	
Tool Steel (see Steels)							
Tungsten:							
Tungsten (including scrap)	W. O. P.	No	No	W. O. P.	W. O. P.*	*Only when sold as scrap.	
Chemicals (see Chemicals Section)							
Vanadium:							
Vanadium (including scrap)	W. O. P.	No	No	W. O. P.	W. O. P.*	*Only when sold as scrap.	
Chemicals (see Chemicals Section)							
Wrought Iron (see Iron):							
Zinc:							
Zinc	W. O. P.	PR A-9	W. O. P.	W. O. P.	No		
Sulphide chemicals (see Chemicals Section)							
Dust	W. O. P.	PR A-9	W. O. P.	W. O. P.	W. O. P.		
Scrap	W. O. P.	W. O. P.	W. O. P.	X	W. O. P.		

Wherever an asterisk (*) appears, refer to the note in the "Remarks" column.

PRIORITIES

might be made without specific authorization of the Director of Industry Operations. These restrictions are now replaced by the conditions established in the new regulation, which controls all sales of restricted material including sales in liquidation and bankruptcy proceedings. Sales of such stocks may now be made without formalities of any kind, and the seller is not required to report such sales. The effect of the new regulation is to simplify the necessary procedures.

"War Material" is reserved for specified purchasers, and consists of about 150 materials listed in Schedule A to the regulation. This material may now be sold to the armed services, Maritime Commission, and certain other Government agencies. In addition, War Material sales may be made to persons who qualify by belonging to a class listed in the Schedule as being eligible to receive such materials.

In general, such authorized sales are "up stream" sales to distributors or manufacturers, or by manufacturing users to producers of raw materials. This serves to restore such materials into normal distribution channels. Applications for specific sales not covered by the general provisions of the regulation and queries should be filed on form PD-470 at WPB field offices. Sales of less than \$100 may be made to anyone.

Materials not listed in Schedule A may be purchased by anyone authorized by existing regulations to receive and make specific uses of them. The new regulation, however, does not exempt a purchaser from end-use and quota restrictions under PRP.

Schedule A sets forth the differing conditions under which metals, chemicals, alloys, and other restricted commodities may be sold and to whom.

The section of Schedule A dealing with metals is reproduced for ready reference. Other sections in the Schedule are: Chemicals and miscellaneous commodities in frozen stocks.



WPB Efforts to Cut Paper Work Viewed Skeptically

Pittsburgh

• • • News from Washington that a strenuous effort will be made by a new organization to cut down paper work and reports, is being

received here with silent rejoicing and also with an inner thought, "Let's wait and see." Behind the scenes, it is said that many Washington officials as well as industrialists do not have a full concept of the mechanics and man power necessary to produce seemingly simple finished reports.

Many reports which finally wind up in government hands as a single sheet of paper require hundreds of work sheets, whole corps

of white collared help, as well as mechanical calculating and statistical machines. The larger the company, the more intricate and voluminous is the preparatory work.

A final report from a large company on the percentage of their orders which constitute USA, USN, LL, etc., and a recapitulation on the various end use classifications, may seem rather simple but the work entailed to produce

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P R I O R I T I E S

this report is tremendous, especially when all five purchasing classification symbols are involved as well as numerous end use classification symbols.

In most cases, large companies have had to use statistical machines because of the various number of distinct and specific products being turned out for the various government lend-lease and defense projects. This is far different, it is said, from the classification problems encountered by

a concern which makes only one product and can use one end-use classification symbol.



Bauxite and Alumina

• • • Intended to conserve high-grade bauxite, that containing less than 15 per cent silica, WPB issued order M-1-h placing bauxite and alumina under complete allocation control, effective Aug. 1.

How to Save

• TIME

• METAL

• MONEY



making STEEL SHELL CASES

If you contemplate the manufacture of steel shell cases, here are two ACP Products that will be of interest to you.

An immersion in ACP's CUP-RODINE produces a dense, adherent coating of copper which substantially reduces wear on dies, cuts time over the electrolytic method, saves plating equipment, bus bars

and copper electrodes.

ACP also offers—from its war-to-war experience in metal treatment and finishing—RODINE, the inhibitor used in pickling after annealing, which produces a smooth pickled surface and minimizes brittleness. In severe draws, this latter is of great importance.

Other ACP Products that contribute to the war effort are: DEOXIDINE to prepare steel, aluminum and dural for painting; LITHOFORM for coating galvanized iron to hold paint; FOSOL, an exceptional soldering flux; KEMICK for protecting metal surfaces even when heated red-hot, and other special chemicals vital to the better, cheaper, faster finishing of metals.

Whether or not there is an ACP Product available for your needs, you are invited to bring your problems here for study and recommendations on the proper chemicals and process to help you meet today's requirements. Write today outlining your problems.

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Predicting increased bauxite production in southern ore fields, WPB stated that the order was made by the rapid increase in aluminum production and the increasingly serious shipping situation. Alumina requirements for 1945 are expected to almost double 1942 needs.

Both Arkansas and imported bauxite containing less than 15 per cent silica will be allocated primarily for the manufacture of aluminum, abrasives, and aviation gasoline. Arkansas is the principal domestic source of high-grade bauxite. The bulk of the country's regular supply is imported from South America.

Restricted as well as non-restricted grades of bauxite mined in Alabama, Georgia, Virginia, Tennessee, Mississippi and other states from small and scattered deposits will be permitted a more general use, such as the manufacture of chemicals and refractories. Use of high silica bauxite, clay, and other aluminous materials in the manufacture of chemical salts is expected to save a hundred thousand tons a year of high-grade bauxite for war purposes.

The order gives consumers of restricted bauxite and alumina until Sept. 1 to use up materials on hand, provided the amount used between July 1 and Aug. 1 does not exceed one-third the amount so used during the last six months of 1941. Consumers of bauxite must file requests for allocation on form PD-567 and alumina users must file requests on form PD-568.



Refrigeration Repairs

• • • High preference ratings for deliveries of materials needed for emergency repairs to commercial air conditioning and refrigeration equipment have been extended until Sept. 30 under the terms of amendment No. 1 to order P-126. The amendment is retroactive to June 30, when the original ratings would have expired.

Order P-216 assigns ratings ranging from A-1-a to A-8 for various types of emergency repair service undertaken by designated Emergency Service Agencies. It also permits suppliers of these agencies to use the ratings.

The amendment provides that suppliers may extend the ratings subject to the conditions of priori-

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ties regulation No. 3, as amended. The amendment also makes certain technical changes in the original order, the effect of which is to write into the body of the order the restrictions on application of the ratings by emergency service agencies which formerly were a part of the endorsement that these agencies were required to attach to their purchase orders.



Rerating Aircraft Orders

Washington

• • • Because of the methods used in scheduling military aircraft production, a special form has been prescribed for use by the armed services in raising the level of preference ratings on certain orders for aircraft and parts.

Under the terms of Priorities Regulation No. 12, the armed services have been authorized to re-rate some outstanding contracts to give preference to a strategic program of military production. In most cases, the higher ratings authorized under the regulation are assigned only to individual contracts for specific quantities of material.

Aircraft production is carried on largely under "open-end," continuing contracts and it would disrupt production schedules to re-rate these existing contracts without limitation, a WPB spokesman said. A new form, PD-4X-1, has therefore been provided for assignment of new ratings to deliveries of specified planes and parts in a definite production period.

Regulation No. 12 permits the assignment of ratings of AAA, AA-1, AA-2, etc., to existing orders of specific authorization from the WPB.



Power Equipment

• • • Limitation order L-117 was amended on July 10 so that contractors engaged in the construction of industrial plants may obtain delivery of heavy power and steam equipment to be used in such plants by extending preference rating certificates on orders issued to the persons for whom such plants are being constructed. Heretofore, order L-117 permitted heavy power and steam equipment

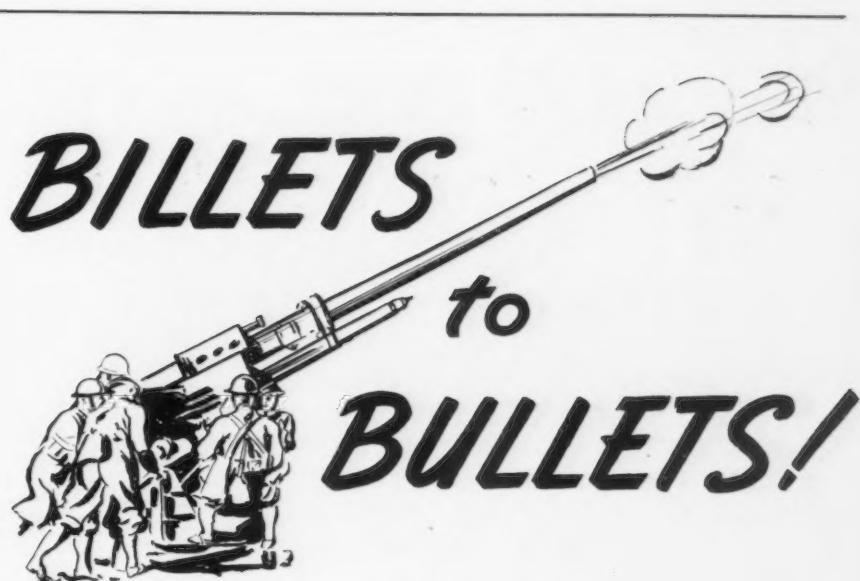
to be delivered only to the person to whom a preference rating certificate or order was originally issued.



Industrial Power Trucks

• • • Manufacturers are prohibited by order L-112 from accepting any orders for industrial power trucks other than those rated A-9

or higher on preference rating certificates PD-1-a or PD-3-a. In addition, no manufacturer may deliver and no person may accept delivery of any industrial power truck except on an order placed before July 10 bearing a rating of A-1-k or higher, or on an order placed after that date rated A-9 or higher on PD-1-a or PD-3-a. These restrictions do not apply to equipment placed in the hands of



Buffalo Billet Shears are cutting forging stock for bullets and shells relentlessly—to help keep the guns roaring in the Victory drive.

Built with "Armor-plate" steel frames, electrically welded and with an overall super-heavy construction to match, Buffalo Billet Shears are tackling this tough assignment. They're easy to control, trouble-free, economical to operate on any size or type of billets.

BUFFALO FORGE COMPANY

492 Broadway
Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



PRIORITIES

a common or contract carrier, before July 10, for shipment to a purchaser.

The order prohibits manufacturers from beginning construction after July 10 of any industrial power truck which is not a standard model as described in a manufacturer's catalog as of that date and as specified in List A attached to the order. Certain exemp-

tions are provided for special-type trucks. After Aug. 15, manufacturers may not begin production of any standard model which is not an "approved standard model." By Aug. 31 and by the 15th day of each month thereafter, each manufacturer is required to submit to WPB, on form PD-385, his proposed production schedule for the third month after

the month in which the form is filed.



Tinplate Stocks

• • • Tinplate or terneplate on hand or in process for packaging certain chemicals, paints, and other "special products" on July 1 may be used according to an amendment to M-81.

A previous amendment had named Feb. 11 as the date beyond which tinplate and terneplate for these products could not be used. The amendment makes it clear that the use, sale, or delivery of cans which were manufactured in violation of any applicable order of WPB is not permitted by the release of the can inventories involved.



Restrictions Eased

• • • The Canadian Army and Air Force, and two of its corporations, the Wartime Merchant Shipping, Ltd., and the Trafalgar Shipbuilding Co. Ltd., received the same exemptions from WPB limitation and conservation orders accorded to the United States Army, Navy and Maritime Commission by the terms of priorities regulation 14.



Utility Inventory Sales

• • • Utilities have been given permission by WPB in an amendment to order P-46 issued July 9, to sell excess inventories to other utility companies or war production plants provided orders carry preference ratings of A-5 or higher.



Food Canneries

• • • An investigation into the operations of food canners to determine their compliance with WPB orders regulating the canning of food stuffs, conservation of tin and terne plate, and the repair and maintenance of canning machinery, has been started by the Compliance Branch of WPB. A large percentage of the companies that will be investigated have not filed seasonal pack reports, and a questionnaire has been designed to obtain the information which

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the companies should have submitted, as well as to disclose the degree of compliance with WPB orders. The Wage and Hour Division of the Department of Labor is designating the investigators to make the examinations.



Sewing Machines

• • • Sewing machine manufacturers have two extra months in which to manufacture repair parts by amendment No. 1 to order L-98. Originally, during the six-month period beginning May 1, repair parts could be made at a rate of 125 per cent of average monthly production of such parts during a two-year base period ended Dec. 31, 1941. This amendment extends the period to eight months, and the permissive manufacture of parts is based on weights of metal used rather than on number of parts. Iron and steel may be used at a rate of 125 per cent of the average monthly use in the base period and non-ferrous metals may be used at a rate of 100 per cent of their use in the base period. Rebuilt sewing machine manufacture must stop, with rebuilders not permitted to rebuild such units after July 15, and manufacturers were ordered to stop rebuilding machines on May 25. Sewing machine manufacturers may transfer inventory for use in industrial machines, which are not affected by the order.



Elevators

• • • No non-ferrous metals or stainless or alloy steel may be used in the manufacture of elevators under the terms of order L-89, and no cork or cork products or rubber tile may be installed on elevator platforms or as wainscoting. Elevators and elevator equipment of a restricted type were placed under strict allocation, with no deliveries permitted except by authorization of the WPB.

The order does not apply to the manufacture of repair or maintenance parts, or to deliveries to fill any order of less than \$500 for parts to be used for repair or maintenance of a single elevator, or to fill any order for \$500 or more for repair or maintenance parts for a single elevator when

there has been an actual breakdown or suspension of operation of the elevator because of the need for repair or maintenance.

The regulation sets up a system of "restricted orders." A restricted order means: An order for an elevator equipped with other than single speed a.c. or d.c., rheostatic control, or equipped with other than manually operated doors or gates. It also means any order

for changing the method of operation or control of any elevator and any order for parts, equipment or accessories to be installed in any elevator. The Army, Navy, Maritime Commission and War Shipping Administration are exempt from the restriction for 90 days.

Specific authorization is necessary to begin the manufacture of, or to deliver any elevator or parts

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to fill a restricted order on the books prior to the issuance of L-89, but on which the process of manufacture had not started at that time. After 30 days' manufacturing operations on any elevator or parts now in the process of manufacture under a restricted order must stop unless authorized.

Only a purchaser filing form PD-411, may obtain authorization to accept delivery of a restricted order now on the books but not yet in the process of manufacture, and only a purchaser may apply for authorization for a manufacturer to accept a future restricted order.

Applications for authorization to continue construction beyond 30 days of elevators or parts now in the process of manufacture on a restricted order must be made by manufacturers as soon as possible. Applications must be accompanied by a report on form PD-562, showing the manufacturer's unfilled orders of all kinds, his future delivery schedule, and complete information on the extent of completion of each order now in the process of manufacture.



PRP Committee

• • • A committee in the Bureau of Priorities, representing interested groups of WPB and the Army and Navy Munitions Board, has been appointed to formulate policies and supervise the administration of PRP and the Allocation Classification System. The new committee, under the chairmanship of Henry P. Nelson, will review PRP application form PD-25-a for use in the fourth quarter.

The form will be simplified as much as possible and all information will be eliminated except what is absolutely necessary for proper assignment of ratings and authorization of materials that companies under PRP may receive. The new forms will be ready within three weeks, so that industry will have ample opportunity to fill them out and return them in time to allow a complete statistical study of requirements before the fourth quarter applications are processed.

The committee will also have full charge of the Allocation Classification System. Other responsi-

P R I O R I T I E S

bilities include establishment of time schedules for all PRP operations, determination of the routing of PRP applications within WPB, and establishment of methods of implements decisions of the Requirements Committee with respect to the acquisition of materials for production by industry.



PD-1-a Certificate Users

• • • If applicants for priority assistance who use individual PD-1-a certificates will enclose with their application blank a self-addressed post card, the case number assigned to their application will be stamped on the card which will be returned to them to facilitate handling subsequent inquiries with respect to the application. Applicants are requested not to make inquiries concerning their cases for two weeks after they have been received by WPB. While normally a case will be granted or denied within this time, this is the maximum time required to process an application.



Compulsory Electrical Code To Speed Up Tool Deliveries

Washington

• • • With certain exceptions machine tool builders in the future will comply with the machine tool electrical specifications approved June 8 by the American Standards Association, and known as American War Standard Machine Tool Electrical Standards C74-1942. This departure was directed by WPB in order L-147.

The standard was developed by the National Machine Tool Builders Association, which requested the American Standards Association to carry it through the ASA emergency procedure.

The limitations contained in L-147 do not apply to machine tools ordered by the Army, Navy or Maritime Commission for their own use. Other exceptions will be considered if reasons for the exception are satisfactory, and such application should be made and sent in triplicate to the Tools Branch, WPB, ref. L-147.

• • • For orders received prior to July 15 calling for special electri-



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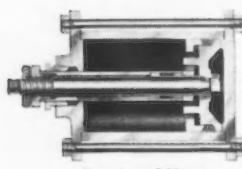
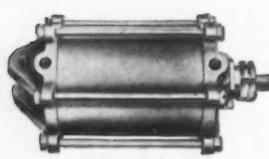
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Sectional View

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P R I O R I T I E S

cal specifications, provision is made for delivery if the tool builders' engineering department had approved the specifications prior to the date of issuance of the order. Likewise delivery may be made if the special motor, control, wiring or other device has already been received by the builder or will be received within 30 days after issuance of the order.

If the machine is ready for delivery but is held up because of non-delivery of special equipment, the builder must request the purchaser to take the equipment normally applied by the builder to his machines. If the purchaser declines, the machine is to be shipped with standardized equipment to the next order scheduled under General Preference Order No. E-1-b for which the tool is suitable.



Future Deliveries

• • • WPB on Monday told manufacturers operating under PRP that they can request suppliers to retain orders on their books for future delivery if they are not in excess of authorized quarterly purchases. This was made clear in an interpretation of Priority Regulation No. 11.



New Priorities System

• • • The WPB Iron and Steel Branch will shortly announce that all mill products will be directed on a quota basis. In short, each mill unit will be told to produce a specified tonnage of each product. For example, a 28-in. mill would be told to roll given tonnages of structural steel, sheet steel, bars and rails. This system lends itself to either a system of schedule or priorities within the quota limits. The Iron and Steel Branch units will be given the individual mill directives and from these directives will allocate so that there is no conflict between units on any product.

The system is being tested on a minor scale prior to general application. It is aimed towards product balance, and in this way those products which are relatively short, such as plates, structural steel, tubing and sheet steel, will be produced in adequate quantities.



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P R I O R I T I E S

**Definition of Terms
Used in PRP Regulation**

Priorities Regulation No. 11: This regulation sets up the Production Requirements Plan to provide for the integration of the system for distributing scarce materials by requiring industrial users to qualify under the PRP and to obtain preference rating assistance under that plan.

Person: Under the plan, "person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons whether incorporated or not.

Material: This is any commodity, equipment accessory, part, assembly, or product of any kind.

PRP Application: PRP application is an application for priority assistance under PRP on form PD-25-a or any other prescribed form.

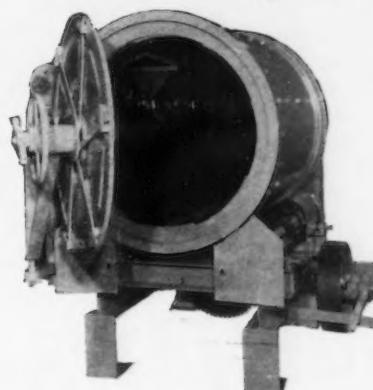
PRP Certificate: A copy of the PRP application is returned to the applicant by the Director of Industry operations with an assignment of preference ratings or other priority action endorsed thereon, and includes any supplementary certificate which may be issued from time to time. A PRP certificate is the returned PRP application.

PRP Unit, means any person qualified under PRP by the issuance to such person of a PRP Certificate. When the Certificate is issued to a branch, plant, department, or other division of a corporation or a business, "PRP unit" refers only to the portion of the business to which the Certificate is issued.

Class I Producer is any person (branch, plant, or other division of a business operating as a separate entity and maintaining a separate inventory) whose receipts or withdrawals from inventory during the most recent calendar quarter, or whose anticipated receipts or withdrawals from inventory during the current or next succeeding quarter, or metals in the forms included in the PRP Metals List aggregate \$5000 or more in value, with the exception of such specified concerns.

Exceptions to PRP Regulation: Certain exceptions to PRP regu-

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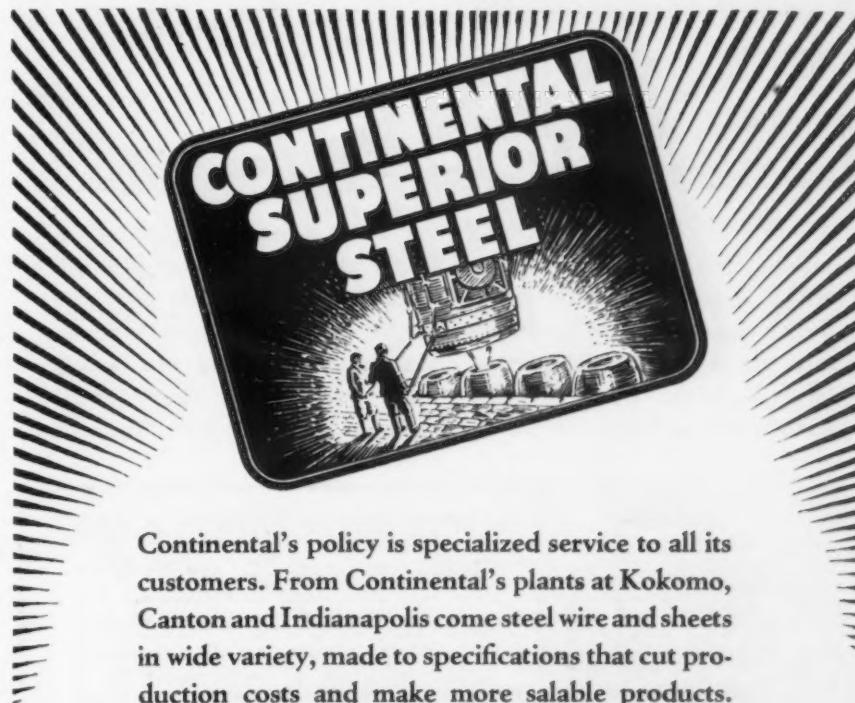
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PRIORITIES

lations are: Any government agency, any foreign government, any state or territory or subdivision thereof, except when and to the extent that any such agency is engaged in the manufacture of commodities or other materials, such as shipyards, arsenal, prison factories, etc. Also excepted are companies engaged in: Transportation; public utilities; mining or quarrying; production, refining, transportation,

distribution or marketing of petroleum or associate hydrocarbons; communications, sewerage or drainage; sale of material not manufactured, processed, fabricated, assembled, or otherwise physically changed, including sales as a distributor, wholesaler, retailer, warehouse, industrial or mill supply house or scrap dealer; extracting, smelting, refining, alloying, or similarly processing metal ores or scrap into raw

metal; and construction of buildings, structures, or projects.

Rating Assignments: Assignment of a Preference Rating means the granting by order or Certificate issued by or under the authority of the Director of Industry Operations, of the right to use such rating.

Application of Rating: An application of a rating means the use of the rating by the person to whom it is initially assigned by or under the authority of the Director of Industry Operations.

Extension of Rating: The use of the rating by any person to whom it is applied or extended by another person is the "extension of the rating."

New By-Product Plants Raise Pennsylvania Coke Output

Pittsburgh

• • • Coke supplies for the production of pig iron in the western Pennsylvania district appear to be well balanced with demand, due partly to recently installed by-product coke plants which are producing more coke than is necessary in the manufacturing operation for which they were designed.

In the western Pennsylvania regions, close to 10,000 beehive coke ovens, out of a total of approximately 11,000 are in operation although some hand drawn units continue in production in hopes that relief may be granted from the ceiling price. It is understood OPA experts have visited the Connellsville, Pa., region to make a thorough check on costs.

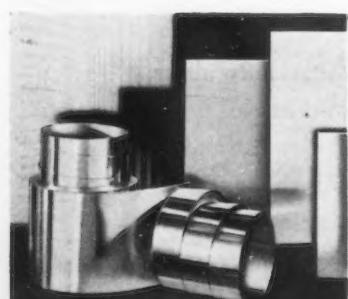
The availability of approximately 60,000 tons of by-product coke from a new western Pennsylvania installation indicates that for the time being no serious shortage of coke for blast furnace fuel is imminent.

June Shape Shipments 481,182 Tons, WPB Says

Washington

• • • The WPB Iron and Steel Branch announced on Monday that the June shipments of shapes amounted to 481,182 tons. The previous high mark since the beginning of the war was 451,000 tons in November. Steel sheet piling represented 16,935 tons of the total. Production for the past several months has ranged from 425,000 to 435,000 tons.

When this "SPECIAL NOTICE" appears on a Government Invitation to Bid, investigate an American Electro-plated ALTERNATE Metal. Wherever used in War Production, these alternate metals have effected savings of critical non-ferrous metals ranging up to 98%. American Electro-plated Metals are easily formed, drawn, bent, stamped or soldered to meet Government specifications fully. Write for samples and full specifications.



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This Week's Priorities And Prices

Allocation Classification System effect on brass and bronze foundries is explained in a statement by the Copper Branch, issued July 9. (WPB1495)

Food canners' operations will be probed by WPB Compliance Branch. (WPB1497)

Material flow to Canada was expedited by placing Canadian services on same basis as services of United States by priorities regulation No. 14, issued July 8. (WPB1503)

Elevators and equipment manufacture and delivery is controlled by order L-89, effective July 9. (WPB-T555)

Tin can use restrictions were eased by amendment No. 1 to order M-81, issued July 9. (WPB-T556)

Refrigeration repair ratings were extended until Sept. 30 by amendment No. 1 to order P-126, effective June 30. (WPB-T557)

Utilities may sell stocks on A-5 orders or higher to other utility companies or war production plants according to Amendment No. 2 to order P-46, issued July 8. (WPB-T559)

A PRP unit has been named in the Bureau of Priorities, representing WPB and the Army and Navy Munitions Board to formulate policies and supervise the administration of the order and the Allocation Classification System. (WPB1478)

Bauxite and alumina were placed under complete allocation control by order M-1-h, effective Aug. 1. (WPB1486)

Frozen stocks of critical materials were freed for vital war production by priorities regulation No. 13, issued July 7. (WPB1489)

Builders' P orders, P-19-a and P-19-h, were amended to include "expendable materials" consumed in construction of the projects under the orders. (WPB-T551)

Track-laying tractor repair parts production and distribution are placed under restrictions by order L-53-b, issued July 7. (WPB-T553)

Iron and Steel Conservation Order, M-126, has been extended by the addition of a supplementary list A of products that may no longer be produced, and list C of products for the Armed services. (WPB 1523)

Plastic molding machinery production and delivery was brought under control of order L-159 on July 6. (WPB-T549)

Asbestos textiles used in the manufacture of brake linings, clutch facings, and other woven friction materials are permitted under Order M-123, will supersede order P-54 and P-57, effective July 6. (WPB-T543)

Industrial power truck production and distribution is controlled by order L-112, issued July 10. (WPB-T564)

Heavy power and steam equipment used in construction of industrial plants may be obtained by contractors under order L-117, issued July 10. (WPB-T561)

Machine tool electrical specifications were standardized under order L-147, issued July 10, effective July 15. (WPB-T565)

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)

Revisions to the Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

Under "M Orders," page 6, add:

M-1-h...Allocates bauxite and alumina, effective Aug. 1, containing less than 15 per cent silica. (7-7-42). Effective until revoked. Related Forms: PD-567, request for bauxite allocation, and PD-568, request for alumina allocation.

M-61...Amended order permits jobbers to acquire but not deliver flake graphite crucibles without authorization. (7-7-42). Related forms: PD-575 (application for crucibles), PD-303-b (application for graphite to make crucibles).

M-81...Amendment No. 1 (7-9-42) to amended order (5-1-42) permits use of tin and terne plate on hand or in process on July 1 for certain products now omitted from order.

M-123...Amended order permits use of asbestos textiles in manufacture of brake linings, clutch facings, and other woven friction materials without an A-10 rating. (7-4-42).

Under "P Orders," page 13, add:

P-19-a...Amendment No. 2 (7-7-42) includes "expendable materials" consumed in construction projects under terms of order.

P-19-h...Amendment No. 1 (7-7-42) includes "expendable materials" consumed in construction projects under terms of order.

P-46...Amendment No. 2 (7-8-42) permits utilities to sell excess stocks of any other utility or war production plants if order carries rating of A-5 or higher.

P-54...Order eliminated by PRP and amended M-123. (7-6-42).

P-57...Order eliminated by PRP and amended M-123. (7-6-42).

P-126...Amendment No. 1 (7-9-42) extends period for granting high ratings for emergency repair materials to commercial air conditioning and refrigeration equipment until Sept. 30, and permits extension of ratings subject to P.R. No. 3.

Under "L Orders," page 19, add:

L-1-g...Amendment No. 1 (7-6-42) re-defines truck trailer to make it clear that order applies also to passenger trailers.

L-4...Superseded by order L-158 (7-6-42)

L-4-c...Superseded by order L-158 (7-6-42)

L-28...Amendment No. 2 (7-10-42) includes Panama Canal in group of agencies given 90 day exemptions from terms of order.

L-35...Superseded by order L-158 (7-6-42).

L-38...Amendment No. 3 (7-10-42) defines phrase "other authorized channels of distribution" included in order.

L-50...Interpretation and explanation of amended order (7-6-42).

L-53-b...Restricts production and distribution of track-laying tractor repair parts (7-7-42).

L-89...Rigidly controls manufacture and delivery of elevator equip-

ment and certain types of elevators. Related forms: PD-411 and PD-562.

L-98...Amendment No. 1 (7-7-42) gives sewing machine manufacturers two extra months to manufacture repair parts and changes base from number of parts made to weight of metal used.

L-112...Controls production and distribution of industrial power trucks. (7-10-42). Related forms: PD-1-a, PD-3-a, PD-385.

L-117...Amendment No. 3 (7-10-42) permits contractors to obtain heavy power and steam equipment to be used in construction of industrial plants. Related forms: PD-2, PD-3, PD-3-a, PD-4, PD-5 or preference rating order P-5-b, PD-1, PD-1-a, PD-25 series, PD-200 and PD-200-a.

L-120...Sets up paper manufacturing specifications in a series of schedules (7-7-42).

L-126...Reduces number of sizes and types of drinking water coolers and refrigeration condensing units for industrial and commercial purposes (7-5-42).

L-38...Amendment No. 2 (7-3-42) clarifies restrictions on sale of drinking water coolers, permitting sale to Army, Navy, Maritime Commission, Coast Guard, and war industries with specific authorizations.

L-128...Amendment No. 1 (7-6-42) permits manufacture, sale, and delivery to Army, Navy and Maritime Commission of automotive valves containing chromium and nickel.

L-143...Prohibits production and delivery of tire manufacturing machinery and equipment except by authorization. Related forms: PD-553 and PD-555.

L-147...Standardizes electrical specifications in machine tools (7-10-42).

L-158...Governs production of spare parts for all types of automotive equipment and imposes restrictions on inventories (7-6-42).

L-159...Restrictions placed on production and delivery of new plastics molding machinery, permitting manufacture of machinery only on rated orders. Related forms: PD-3, PD-3-a, PD-1, PD-1-a, and PD-554.

Under "Priorities Regulations," page 33, add:

No. 12...Provision for re-rating open end contracts for aircraft and parts through the use of form PD-4x-1, assigning AAA, AA-1, AA-2, etc., ratings (7-10-42).

No. 13...Establishes method of disposing of critical materials frozen in idle inventories (7-7-42).

No. 14...Provides that where the United States Army, Navy, and Maritime Commission are excepted from the terms of priority orders, the corresponding Canadian agencies, Army and Air Force, Navy, Wartime Merchant shipping, Ltd., and Trafalgar Shipbuilding Co., Ltd., are also excepted (7-8-42).

Questions and Answers on PRP and Allocation Classification

• • • Questions and official WPB answers concerning the Production Requirements Plan and the Allocation Classification System are continued from last week's series. The questions shown are typical questions asked by manufacturers, distributors, and other business operators that now are or are about to come under the PRP.

• Who must comply with Priorities Regulation No. 10?

All persons must transmit the appropriate allocation classification symbol and purchasers' symbol on any purchase order placed by them with their supplier. This includes processors, manufacturers, wholesalers, distributors, jobbers, etc., including industrial and mill suppliers warehouses and other business performing similar functions for industry.

• What are the exceptions?

Allocation classification symbols and purchasers' symbols are not required on any single purchase order or contract covering items sold at an aggregate price of \$15 or less, or on any purchase orders or contracts covering sales to or by retailers.

• If a business has no purchasers' symbol, how is its procedure determined?

Business whose operations are not included in any of the listed classifications will transmit to their suppliers, the allocation symbols and purchase order numbers received from their customers orders.

• What allocation classification symbol does a retail dealer place on his order to a manufacturer to fill his order from the Army, coded U.S.A. 6.90?

U.S.A. 6.90. In this instance, the retailer would be in possession of a symbol to transmit to his supplier, and in this transaction he would be classed as a military supply house. The same would be true if the retailer received a purchase order from an industrial plant. He would then transmit on his purchase order, the symbol pattern received from the industrial plant. In this instance, he would be an industrial mill supplier. Whenever symbols are available for transmission, retailers are expected to transmit them to their suppliers.

• What purchasers' symbol does a prime contractor place on his order for operating supplies, to fill an order coded U.S.A. 4.10?

It depends upon whether or not his industry is classified. If so, he would use the numerical classification symbol applicable to his industry. If the industry did not have an applicable numerical allocation symbol, he would transmit U.S.A. 4.10 on his purchase orders.

• What purchasers' symbol is applied to purchase orders placed by the Treasury Department, War Production Board, Office for Emergency Management, and other Government agencies other than the military?

All purchase orders by U.S. Government agencies are marked with the purchasers' symbol D.P., except in such cases where title to the purchase will pass to either the U.S. Army or Navy, Lend-Lease or Foreign Purchases.

• What symbols will appear on the purchase orders for wire rope of a manufacturer of cranes where 50 per cent of his production is required for Army cranes, 10 per cent for Foreign Purchases, 10 per cent for Lend-Lease, and the balance required for steel mills who transmitted a pattern reading U.S.A. 50 per cent, D.P. 50 per cent?

U.S.A. 20.20, 65 per cent; F.P. 20.20, 10 per cent; LL 20.20, 10 per cent; D.P. 20.20, 15 per cent.

• What symbols will be transmitted by the wire manufacturer to the supplier?

Wire manufacturers are not listed, therefore they transmit intact the customers pattern of symbols on their purchase orders for wire.

• If end use purchasers' symbols are F.P., and materials are to be used in British Factories what purchasers' symbols are to be transmitted, if any?

Telephone Republic 7860, British Supply Counsel in North America, Benjamin Franklin Station, Washington, D.C., who will advise the applicable symbols to be used.

• If orders are received after June 30 without allocation and purchasers' symbols, can the manufacturer apply the symbols where the end use is known?

Yes.

• Who applies the purchasers' symbols and do they ever change in transit?

Purchasers' (letter) symbols are applied to all purchase orders and contracts by the initial purchaser if for the Army, Navy, Lend-Lease. If for a Foreign Purchaser, by that purchaser or his agent. If a D.P., by the wholesale distributor. They never change on any purchase order in being transmitted from end user of finished product to supplier of raw materials.

• Is a smelter of non-ferrous metal required to transmit customers' symbols on purchase orders for ores and scrap?

Yes, for both ores and scrap.

• What numerical allocation symbol is applied to building maintenance and repair?

All purchases for building maintenance and repair should be assigned 22.00.

• What symbols are applied to purchase orders for supplies, equipment, machinery and facilities?

With the exception of manufacturers falling under Class 8, the manufacturer will place on his purchase order the same symbols and numbers for operating supplies, capital equipment and machinery that he places on orders for raw material. This, of course, excepts construction of new buildings and building maintenance and repair covered under Class 21 and 22.

• If a refiner melts non-ferrous metals on toll agreements, are any symbols required, and who applies them?

Refer to preceding question. He is using materials and symbols transmitted to him by the person with whom he has the toll agreement.

• If a refiner buys scrap as an agent of Metals Reserve Corp. and returns ingot to the Metals Reserve Corp., who applies the classification symbol and the purchasers' symbols?

The Metals Reserve Corp. The refiner is only performing services.

• A manufacturer of small tools makes up orders for customers whose orders bear various allocation classification symbols and purchase order numbers. Whose symbols does he use for raw materials, his own capital equipment, and operating supplies?

A manufacturer of small tools would fall under Class 22.

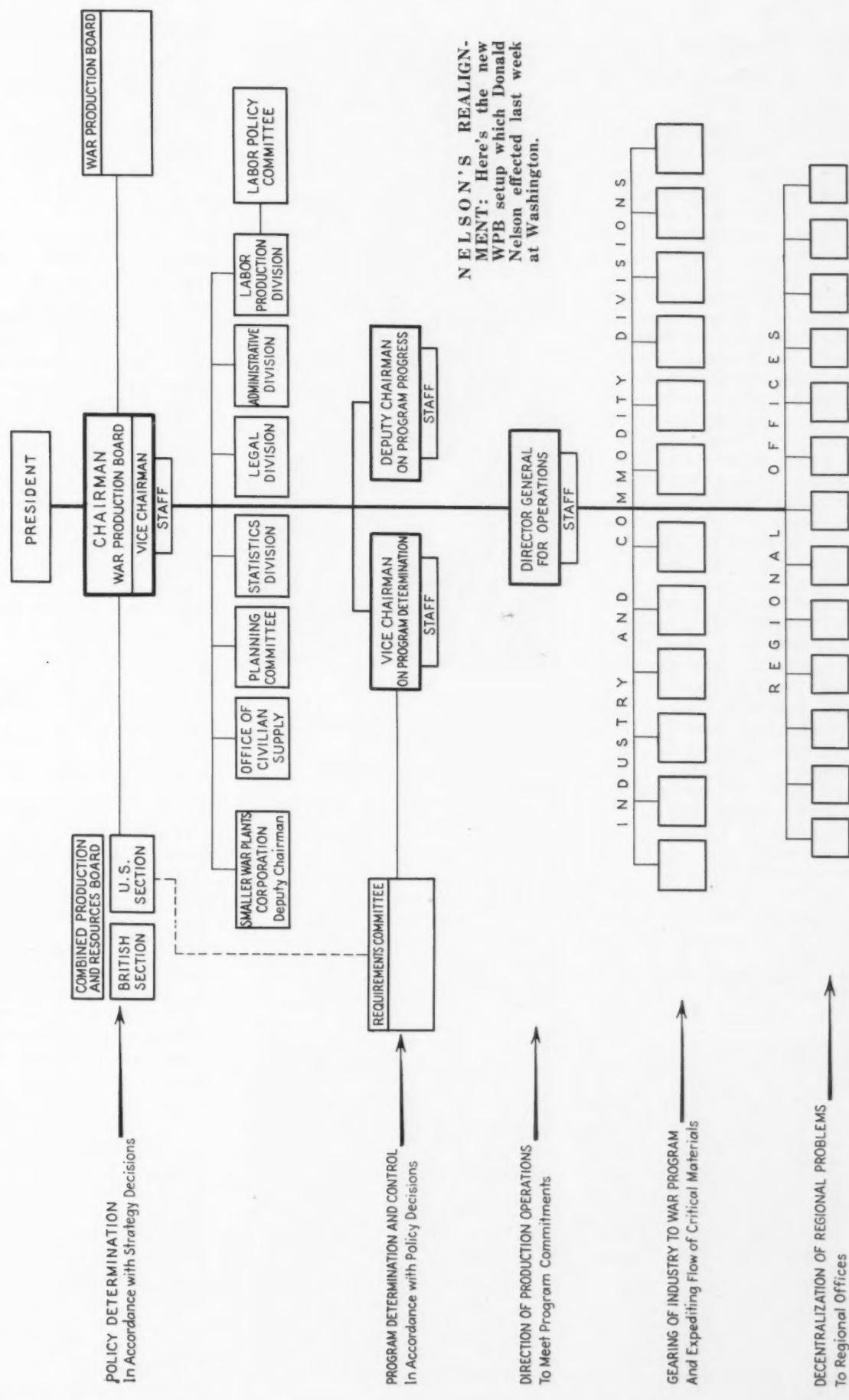
• What symbols should be applied by bus transportation companies, fleet taxicab companies and fleet motor truck companies for maintenance, repair, and operating facilities?

For the maintenance and repair of their buildings, 22.00. For the successful operation of their automotive equipment, 10.20. Note the use of word "companies." This does not include individual owners of taxicabs, busses or trucks, but is intended to cover only fleet operations. Individuals are not required to place a symbol on their purchase orders, as they would be classed as retail purchasers.

• Is the information transmitted on purchase orders the basis for allotment of raw material?

The allocation classification is a system of symbols, comprising both letters and numerals in decimal sequence used in arbitrarily codifying and classifying the products of industries so that the materials and component parts entering into those products may be identified and traced, through regressive stages of distribution and manufacture, back to their original source.

WAR PRODUCTION BOARD ORGANIZATION



Vacation Plan Cuts Scrap Loss in Casting

Flint, Mich.

• • • The General Foundry & Mfg. Co., producer of Meehanite castings, has been able to reduce its scrap loss by some 48 per cent and increase its yield by 3 per cent over the past nine months in its plant located here, according to A. D. McCaughna, president. This substantial improvement is credited largely to a new type of employee vacation plan instituted by the company on March 14, 1941.

While there were undoubtedly other factors aiding in the scrap loss reduction, Mr. McCaughna believes that chief credit should be given to this new vacation plan.

In this plan, the amount of funds set aside each month for the employees' vacation fund is in direct proportion to the scrap losses for that month. Thus, the employees are given an incentive for more efficient work, and scrap losses, instead of being merely a management problem, have become the direct concern of each worker.

The plan, which is set forth in detail in a booklet given each new worker, stipulates that the iron melted per day in any given month must average a specified amount per day before any reserves can be set aside for vacations. An employee must have been on the payroll and working a year before he is entitled to a vacation.

The company has agreed to set up a minimum cash reserve for vacations of 1 per cent of the pay received by an employee during the month, regardless of the scrap loss. However, by operating with a low loss, this reserve set aside by the company increases on the following basis.

1 1/4 per cent is set aside where scrap averages	6 per cent
1 1/2 "	5 3/4 per cent
1 3/4 "	5 1/2 per cent
2 "	5 1/4 per cent
2 1/4 "	5 per cent

Employees are given the privilege of drawing out, between Dec. 15th and 25, up to 75 per cent of the vacation funds to their credit for such purposes as a Christmas fund, etc.

The value of the castings saved by virtue of the reduction in scrap since the vacation plan went into effect was estimated by Mr. McCaughna to be between \$55,000 and \$60,000. He also pointed out that this improvement was made



A. D. McCAUGHNA

Coatesville's Scrap Story Outlined in New Booklet

• • • How an industrial concern enabled its home community to establish what is believed to be a record for the collection of war-use salvage is disclosed in a brochure just issued by Lukens Steel Co. of Coatesville, Pa.

In the foreword, the company explains: "We at Lukens Steel, engaged 100 per cent in war work, are acutely conscious of the importance of salvage collection, because, on occasion, we have been forced to shut down steel-making furnaces because of lack of iron and steel scrap."

Acting upon that consciousness, Lukens Steel planned, launched and led a Coatesville salvage-collection drive that yielded scrap to the total of 616,065 lb. By the last census, Coatesville's population is 14,582. Hence the drive's per capita "score" was 46.68 lb., which, in Coatesville, figures out to 226.92 lb. from each home.

Scrap collected included 616,065 lb. of iron and steel, 9410 lb. of rubber, 3233 lb. of other metal scrap, 44,688 lb. of paper and 7365 lb. of rags.

Inland Ore Carriers All Break Trip Records

Chicago

• • • Every ore carrier of the Inland Steel Co. lake fleet has broken its all-time cargo-carrying record since the start of the season on April 1. Flagship of the Inland fleet, and most consistent compiler of new records during the current struggle to maintain the ore stock piles necessary for above-capacity steel ingot production, is the *L. E. Block*, commanded by Capt. H. H. Kizer.

The *L. E. Block* docked July 8 with its biggest cargo—one which compares favorably with the Great Lakes record tonnage for ships of all capacities. The *Block* brought in 16,252 gross tons of iron ore from the Mesaba range in Minnesota, loading at Superior, Wis.

The *Joseph Block* also has set new records for limestone shipments from Port Inland, Mich.

The *Leopold* and the *P. D. Block* also have bettered last year's biggest tonnage totals for iron ore.

PERSONALS

• **E. J. Kulas** and **Edward B. Greene**, both of Cleveland, were elected to the board of directors of the Jones & Laughlin Steel Corp. Mr. Kulas was also elected vice-chairman of the executive committee. Mr. Kulas was formerly president of the Otis Steel Co., Cleveland, which is now the Otis Works of the Jones & Laughlin Steel Corp. Mr. Greene is president of Cleveland Cliffs Iron Co. and was a director of Otis. The new directors replace James C. Watson and W. L. Copeland.

• **E. F. Johnson** has been elected a vice-president of General Motors Corp. and appointed as group executive in charge of the recently organized Eastern Aircraft Division of General Motors and of the six divisions of the corporation in Dayton, Ohio. During the past two years he has served in Washington with government war production agencies. Formerly he was in the employ of General Motors as assistant to the vice-president in charge of the Parts and Accessory Divisions of the corporation. He will have under his jurisdiction, in addition to Eastern Aircraft, Frigidaire, Delco Products, Delco Brake, Moraine Products, Aero Products and Inland Manufacturing.

• **Harry L. Wise** has been named president and general manager of Hydraulic Machinery, Inc. Mr. Wise has been sales engineer with Vickers, Inc., for the past seven years. He has been identified with tool engineering and machine design in the Detroit area since 1918, in association with Ex-Cell-O, Frederick Colman & Sons and Snyder Tool & Engineering Co.

• **S. K. Towson** has been elected president and general manager of Elwell-Parker Electric Co., Cleveland, to fill the vacancy caused by the death of M. S. Towson. **W. A. Meddick** has been named vice-president, and **C. B. Cook**, director in charge of export and government sales, and general sales promotion.

• **Glenn C. Gridley** has been elected president and general manager of the Mechanics Universal Joint Division of the Borg-Warner Corp.

at Rockford, Ill. He has been with the firm since 1916 and has been vice-president and general manager.

• **W. R. Dewey** and **R. E. Spokes** have been elected vice-presidents of the American Brakeblok Division of American Brake Shoe & Foundry Co. Mr. Dewey is the plant manager and Mr. Spokes is technical director of the company.

• **R. A. Becker** has been named branch manager of the Baltimore branch of Gar Wood Industries, Inc., Detroit. Mr. Becker will succeed **R. J. Grow** who has entered the United States armed forces.

• **Murray M. Baker** has been appointed to the newly created post of executive vice-president of R. G. LeTourneau, Inc., Peoria, Ill.

• **R. Nevin Watt** has been appointed general sales manager of the Baldwin Locomotive Works. Mr. Watt will have general supervision over all sales of the locomotive and ordnance division and Standard Steel Works Division of Baldwin. **Walker H. Evans** has been named sales manager of the Standard Steel Works Division to replace Mr. Watt. **Joseph G. Broz**,

formerly sales manager for Baldwin De La Vergne Sales Corp., has been made sales manager of the diesel division of Baldwin.

• **J. A. Comstock** has been placed in charge of all material control functions of the Pratt & Whitney Aircraft Division of the United Aircraft Corp., East Hartford, and will head the physical and chemical laboratories now established as a part of the inspection department.

• **F. W. McIntyre** has returned to his duties as vice-president and general manager of Reed-Prentice Corp., Worcester, Mass., after spending 15 months with the War Production Board, Tools Section, at Washington.

• **J. M. Gilfillan**, for the past two years works manager of the Locke Insulator Corp., Baltimore, has been elected vice-president in charge of manufacturing.

• **Philip W. Frieder**, of the Philip W. Frieder Co., Cleveland, has resigned as vice-president of the Institute of Scrap Iron and Steel to accept the post of technical consultant on scrap to the Metals Reserve Co. **Everett B. Michaels**, of the Hyman-Michaels Co., Chicago, who has been treasurer of the Institute, was elected vice-president to succeed Mr. Frieder. **Hiram Winternitz**, president of the

ASTE WAR PRODUCTION CONFERENCE: A War Production Conference will be held by the Tool Engineers at Springfield, Mass., on Oct. 16 and 17. Members of the committee in charge are, seated, left to right: Andrew P. Schoeffler, New Haven, Conn.; Edward C. Sheldon, Springfield, Mass.; Frank W. Curtis, Springfield, Mass. Standing are Harry J. Hauck, Hartford, Conn.; Ray H. Morris, Elmira, N. Y.; and Edward J. Berry, Providence, R. I.



Charles Dreifus Co., Philadelphia, succeeds Mr. Michaels.

• **James M. Hogland** has been named sales engineer in the Pacific Coast area by the American Screw Co., Providence, R. I.

• **Robinson D. Bullard**, reclamation engineer for the Bullard Co., Bridgeport, has been appointed technical consultant to the Industrial Salvage Section of the Bureau of Industrial Conservation of the War Production Board. He will assist in preparing a definitive book on industrial reclamation.

• **Robert H. Pyle** has been appointed district representative for the McKenna Metals Co., Latrobe, Pa., in Southern Indiana.

• **Graham Lee Sterling, Jr.**, has been appointed vice-president and general counsel of Northrop Aircraft, Inc. Also a director of the company, he is abandoning his general law practice in Los Angeles to devote full time to Northrop affairs.

• **Benjamin Schwartz** has been appointed chief of the Scrap Metals Section of the Board of Economic Warfare. Mr. Schwartz was formerly the director general of the Institute of Scrap Iron and Steel, and vice-president of Schiavone Bonomo Corp. of New York and Jersey City.

OBITUARY . . .

• **Albert John Troja**, general manager of the Griffin Wheel Co., Los Angeles, died last week. He was 60 years old.

• **John R. Bucher**, sales manager of "Canton" Division of the Hill Acme Co., Cleveland, and formerly associated with the Canton Foundry & Machine Co., Canton, died July 8, aged 55 years. For the past 35 years he was closely identified with the manufacture of alligator shears and portable cranes.

• **James G. Millar**, retired general superintendent of the Buffalo Foundry & Machine Company, died June 29 in his home at Snyder, N. Y. He was 67 years old. He was a member of the American Foundrymen's Association. Ill health forced his retirement in 1937.

• **George B. McConnell**, manager of operations, Scully Steel Products Co., Chicago, died last week at his home, aged 46 years. Mr. McConnell has been associated with the Scully organization since 1923. He became manager of the engineering department in 1927 and was appointed manager of operations March 24, 1942.

• **Robert F. Runge**, vice-president

of S K F Industries, Inc., Philadelphia, died July 6 in Germantown Hospital after a prolonged illness. He was 56 years old. He was graduated from Drexel Institute in 1906 and went to work in the engineering department of the Hess-Bright Mfg. Co., which later became S K F.

• **George L. Cadman**, for many years associated with the Beloit Iron Works, died in Beloit, Wis., recently after a long illness.

• **J. E. Porter**, vice-president of the Ford Motor Co. of Canada, was fatally stricken recently by a heart attack while inspecting one of the company's plants in Windsor, Ont. He was 51 years old. Mr. Porter had been connected with the Ford company for 20 years and had been in charge of the company's engineering activity. Born at Wingham, Ont., he was a graduate of the University of Toronto and a member of the Engineering Institute of Canada.

• **A. K. Reading**, who was in the Forgings and Castings Section of WPB's Iron and Steel Branch, died July 8, aged 59 years. Mr. Reading formerly was associated with the Zimmerman Steel Co., subsidiary of Bettendorf Co., Davenport, Iowa.

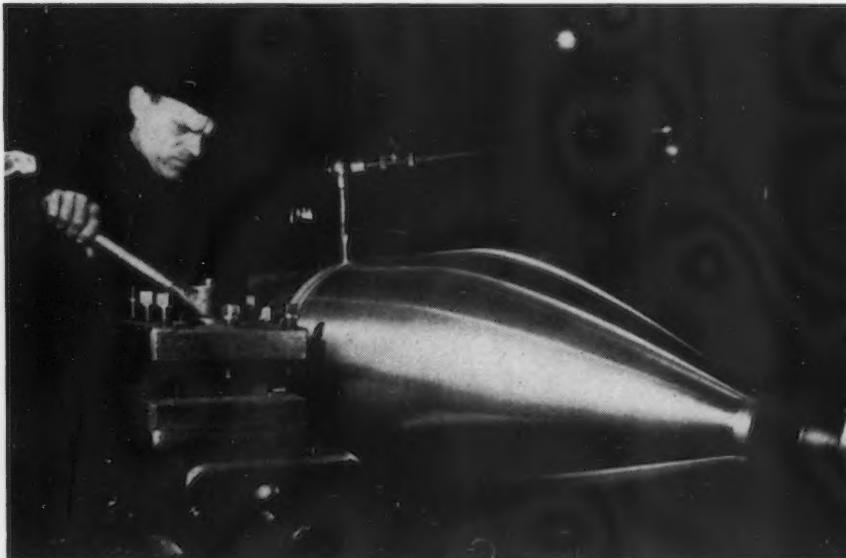
• **Christoph Stein**, for many years proprietor of a structural steel foundry in Milwaukee, died July 4 after a short illness, aged 81 years. He came to Milwaukee from Germany at the age of 22 years, and studied the pattern maker trade before he acquired the foundry which he operated for 40 years.

• **Arnold K. Fitger**, president of the Refractories Corp., the Kelco Co., the Fitger California Co., and general manager of the Metalite Corp. died at his home in Beverly Hills, Los Angeles, aged 51 years. With his father, the late August Fitger, he founded the Celite Co. at Lompoc, pioneers in the silica industry.

• **William E. Clark**, of W. E. Clark & Co., Boston, died June 25, aged 49 years.

SOVIET BOMB IN THE MAKING: A Stakhanovite turner of the Urals heavy machine-building plant is shown at work on a huge bomb for the Russian Air Force.

Acme Photo



NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

1941 Lead Consumption Set at 813,000 Tons

• • • About 813,000 short tons of refined soft lead were used in 1941, according to preliminary results of a consumer survey conducted by the Bureau of Mines, U. S. Department of the Interior, covering approximately 475 companies. Output of primary lead from domestic and foreign sources in 1941 amounted to 570,967 tons, an increase of 7 per cent from the output of 533,179 in 1940, and the largest total since 1930.

The principal sources of lead in the U. S. were, as formerly, Missouri, Idaho and Utah. Of the 100,450 tons of lead produced from foreign ore, matte, and bullion, 27,173 tons were from South America, 19,561 tons from Australia, 5708 tons from Canada, 390 tons from Mexico, and only 123 tons from Europe. Mexican bullion accounted for 25,358 tons.

Government stockpiles of foreign lead purchased through MRC were drawn on during 1941 to bridge the gap between production and shipments. As a result, the large quantities of lead that had accumulated in bonded warehouses by the end of 1940 were notably depleted during the first nine months of 1941.

• • • Brass and bronze foundries will come under the Allocation Classification System on Aug. 1, and actual shipments made during July are to be reported on forms PD-123A and 123B. Until that time, consumption and scheduled shipments of copper are to be reported to WPB Ref. M-9-b on form PD-518. Authorization to receive and to remelt copper scrap, copper base alloy scrap and copper base ingot will be issued to the foundry on form PD-518-a. If this form does not authorize use of sufficient metal the foundry may apply to WPB by letter for permission to use more.

End-use must be reported for any deliveries made after June 30, 1942, regardless of when the order was entered. On the basis of the reports, metal will be allocated to foundries to replace that shipped. So that WPB may know the end-use of all of this metal, it requires that

Non-Ferrous Prices

(Cents per lb. for early delivery)	
Copper Electrolytic ¹	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis ²	8.25
Lead St. Louis ³	6.35

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct $\frac{1}{4}$ c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery lots of 2 tons or more. ANTIMONY, prompt; Asiatic, nominal, New York: American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, \$197 to \$199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial \$5.5-5.5, 13.25c. a lb.

the foundry in turn secure this information from its customers, who must place the appropriate allocation classification symbol and purchaser's symbol on each purchase order. Thus an order for bronze bushings for eventual use in an Army tank would bear the symbols 4.70 USA.

End-use is an important consideration. Although an order carries a very low rating, it may be vital to the war program. Therefore, it is important that certain orders bearing preference ratings lower than A-1-k be received and reported to WPB for possible authorization. Listed below are end-uses for which the WPB's copper branch will seriously consider authorizing copper even if the orders bear a rating lower than A-1-k. These uses and the allocation classification symbols which they should carry are:

Railroads—10.10; street cars—10.90; buses—10.90; public utilities—9.00; maintenance and repair of essential industrial equipment*; mines—8.10; petroleum industry—9.20; water works—12.10; hospitals and health supplies; maintenance and repair of schools—17.20; textile industry producing for Army or Navy—6.20; defense housing (critical list in specified areas)—21.20; fire-fighting equipment—12.30; essential repairs for farm machinery—13.00; essential repairs for elevators—22.00; essential repairs for food preservation machinery and dairy equipment—

14.00; essential parts for road building equipment—10.30.

* Carries symbol of foundry, or of customer if no foundry symbol issued.

Paper Containers from Existing Can Lines

• • • A new method of manufacturing paper-bodied containers on existing can lines has been developed by the American Can Co. As soon as it has been thoroughly tried and perfected through actual production the company will make it available to the entire canning industry for the duration. The process, if successful, may well be considered the most important development within the can manufacturing industry during the past decade.

Heavy paper similar to that used for milk containers will be cut to size, lithographed on the regular presses, and fed to the can line. The new containers will be available to the extent that black plate is made available for the manufacture of ends. Producers of dry products will be the principal beneficiaries of the new development, though a few liquid products, other than processed food, may also be affected.

Aside from the potential saving of steel and tin, the process has the advantage of requiring no new machinery. Not only may existing can lines be adapted for it, but users of the new containers will be able to fill them on existing packaging machinery. In appearance, the paper containers will closely resemble the cans they replace.

Canada to Increase Non-Ferrous Output

• • • Canadian production of copper, zinc, lead and other strategic metals will be increased, and the additional ores secured will be supplied to the MRC of the U. S. This arrangement, according to G. C. Bateman, Canadian Metals Controller, will probably result in the opening of certain sub-marginal deposits in Canada. Mr. Bateman pointed out, however, that due to the shortage in machinery and manpower, no deposits will be exploited unless they can be advantageously worked.

MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

Idle Machine Hours Reported In Cincinnati Area

Cincinnati

• • • More than 35,000 unused hours of possible operation of "critical" machine tools exist in the Greater Cincinnati area, according to announcement of the regional office of War Information at Cleveland. According to C. J. Perrier, regional chief of the critical tools section, the Cincinnati area has about 219 owners of such machinery, and about two-thirds of them

... A standardization of electrical specifications in machine tools was ordered this week by WPB. Details of the order are shown in the Priorities News section of this issue.

have tools with idle time available. The most frequent machines found to have free time available included horizontal and vertical boring machines, external cylindrical grinders, steam drop hammers, engine and turret lathes. The report of the Board continued, however, that owners are cooperating with the W.P.B. efforts to get war jobs and available machinery together. The report was based upon the week ending July 3 and covered a survey of probably 57 per cent of the owners of critical machinery.

New Buying Expected

Chicago

• • • While some cancellations are still being received by machine tool interests here as an aftermath of the tremendous buying earlier this year before the new restrictions went into effect, backlogs have shown little noticeable change. Buying for several new war plant projects in this area is expected to get under way shortly. Quotations on some of the requirements have already been made.

The trend to standardized tooling by many machine tool makers in an effort to speed the production is putting an added burden on the tool engineering staffs of many war plants and is making the scarcity of good tool engineers more keenly felt.

Gear Sales Declined in June

• • • Industrial gear sales in June were 12.7 per cent below May but were 24.7 per cent above June, 1941, according to the American Gear Manufacturers Association. Sales for the six months ending June are 35.6 above the sales for the first half of 1941.



The difficulty of rounding up all the component parts of a machine tool is fast becoming an important factor in shipping dates. This is particularly true with respect to electrical equipment which is becoming increasingly hard to obtain.

Delivery Situation Unchanged

Cleveland

• • • Despite ever-widening subcontracting and continued scattered cancellations, the backlog of machine tool producers here appear to be relatively unchanged, and the delivery situation has not improved to any noticeable extent, as a whole.

Regional offices of WPB are now publishing lists of machines upon which certain numbers of idle hours are available. It is interesting to note that the latest list includes several large planers, turret lathes, and other machine tools which are particularly difficult to secure at this time.

The demand for briquetting machines for steel turnings continues relatively strong, and it has become difficult to secure early delivery for such equipment. Moreover, obtaining of equipment to remove the oil

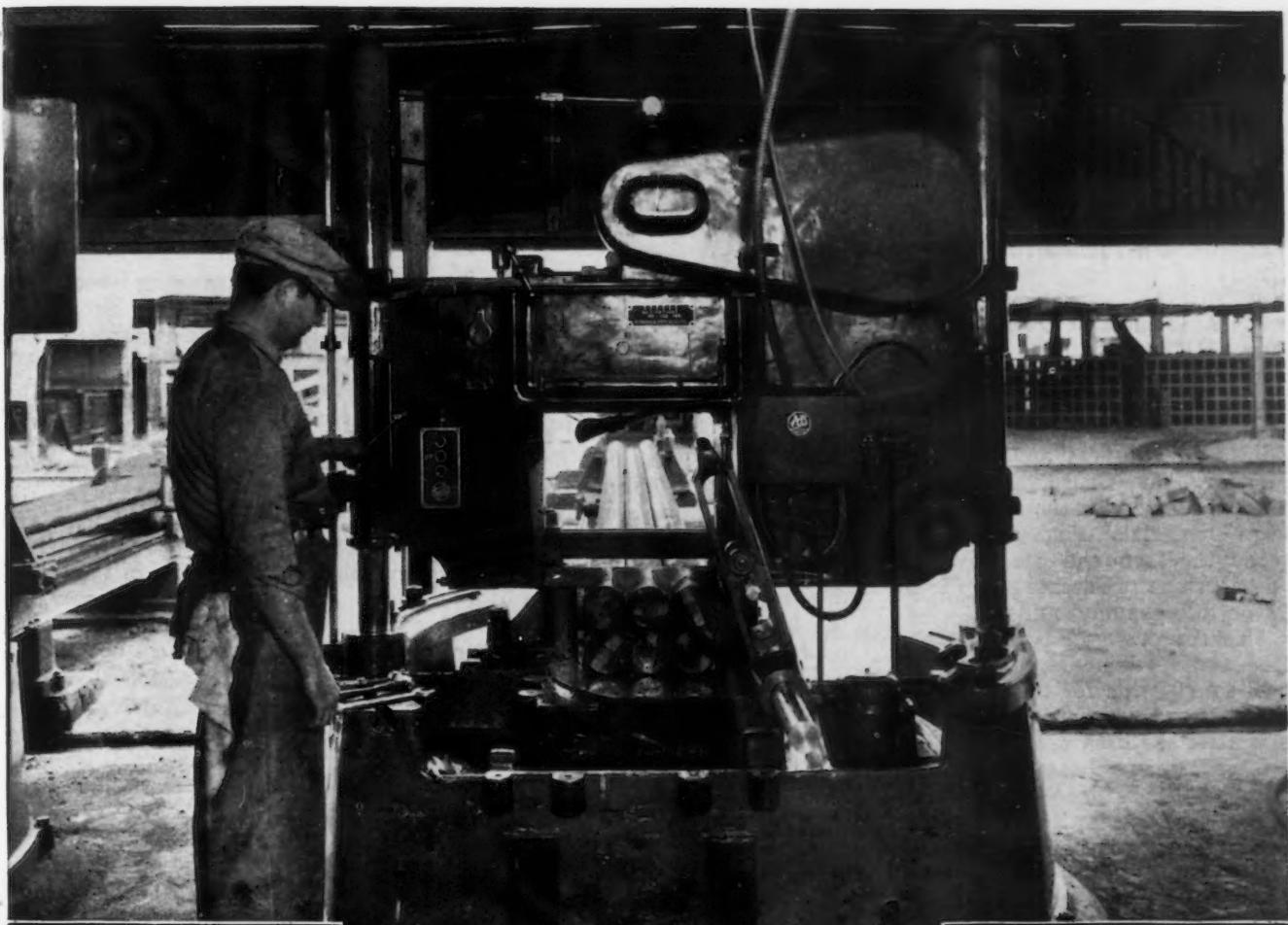
from such turnings before briquetting them has also been a rather serious problem. As it is, steel turnings in this area are backing up due to the equipment bottleneck.

Among the expansions announced in this area within the past week are included projects that will be undertaken by Federal Foundry Supply Co., Lewis Machine Co., Federal Gear, Ferro Enamel Corp., and Timken Roller Bearing Co. Of these, expansion programs of Federal Foundry and Timken Roller Bearing probably will be the largest, with the former constructing several plants in western Pennsylvania and the latter erecting a new factory at Columbus, Ohio.

Many Critical Tools Idle

Milwaukee

• • • Industries in Wisconsin still have critical machine tools idle for long stretches of time, according to Fred L. Beelby, field supervisor for the WPB, Washington, after a conference with district chiefs through the state. He was accompanied by John Mueller, assistant field supervisor, and C. S. Bloom, Chicago, regional supervisor.



MARVEL SAWS

**Cut anything that will
go between the jaws**

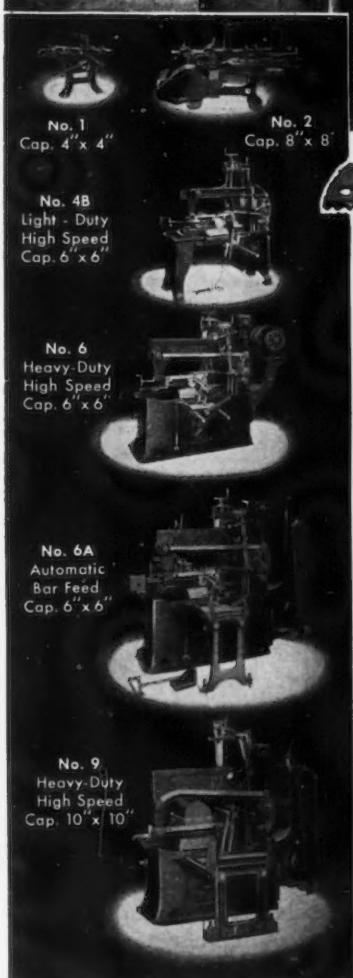
This is one of five No. 18 MARVEL Giant Hydraulic Hack Saws used by a well known Texas tool company to cut-off "multiple bars of alloy steel in round, square, and flat shapes, up to the maximum capacity of the large work-throat (18" x 18")".

These super hack saws are designed for the largest sizes, and toughest steels—up to 18" x 18". After a year's heavy duty service, when asked as to the effectiveness of these saws in solving the cutting-off problems at this plant, the mechanical engineer in charge reported them "very effective."

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. Chicago, U. S. A.
Eastern Sales Office: 225 Lafayette St., New York



SCRAP

... MARKET ACTIVITIES AND QUOTATION TRENDS

Agreement Reached On Handling Scrap

Washington

• • • **Agreement between Director Reese H. Taylor of the WPB Iron and Steel Branch and Director Lessing J. Rosenwald, of the WPB Conservation Division for the handling of scrap was announced on Monday. The Conservation Division will supervise the flow of salvage materials through dealers while the Iron and Steel Branch will continue to allocate scrap from yards to consuming mills.**

The recent suggestion that the iron and steel industry set up its own scrap yards for the collection, segregation and preparation of old materials has been discarded.

Mr. Rosenwald said that the heavy demand for scrap and the difficulty of moving it during cold weather makes it imperative to intensify the flow now and said that supervision of the task had been placed in the Conservation Division's Graveyard Section headed by Merrill Stubbs. To dispel a misleading impression that has gained considerable publicity officials of the division warned the public against assuming that scrap yards are not patriotic, simply because certain yards are piled with iron and steel scrap. It was explained that both scrap yards and auto-graveyards, to be effective, have to

keep satisfactory inventories and that the efficiency of a yard is measured by the flow of scrap to the mills, rather than the amount of material on hand at any one time. It was added that the Graveyard Section will see to it that dealers keep adequate records for inspection by officials.

"Our chief objective," said Mr. Stubbs, "will be to help dealers do all they can to locate, purchase, process and ship scrap to the steel mills at a rate greater than ever before. We are confident that scrap dealers will cooperate in expediting the flow of scrap and that it will not be necessary to requisition their yards.

Scrap dealers handle approximately one-quarter of the raw materials feed into steel furnaces. To meet the tremendous demands for prepared scrap, dealer's yards and equipment must be used efficiently, so long as there is material to be processed. A volume of material unequaled in the country's history is now flowing through their yards, but to meet the increased enormous demands of the steel industry, their operations must be improved and maintained. Scrap must not stagnate in dealers' yards."

Mr. Stubbs pointed out that advanced buying must be confined to materials which can be processed within 60 days or less.

"EL" DEMOLITION: Mayor Fiorello H. La Guardia opened the ceremonies at the 23rd Street station, in New York, wrecking the Second Avenue elevated. This scrap metal will go to steel plants for production of steel for war machinery.

INS Photo



Court Actions and Big Drive in Spotlight

• • • Like a three-ring circus, developments were going on simultaneously in varied spheres of the scrap market last week. The WPB non-stop national salvage drive started Monday. At the same time two steel companies and two scrap dealers argued in Federal Court at Pittsburgh for dismissal of a government restraining order. In Washington OPA was studying possible improvements in the scrap price structure. And all over the nation consumers and dealers were struggling to keep steel operations on an even keel.

The national scrap drive's impetus was scheduled to come largely from the steel industry's \$1,500,000 fund for national advertising. The campaign could also stand a stronger Presidential send-off, clarity on the point of profits for those handling the scrap, and better coordination of junkmen into the picture. While the individual peddler in the overalls does not collect a large proportion of scrap, the tonnage he does pick up represents a strategic amount and his knowledge of the business is invaluable.

A new price for baled turnings was reported being studied by OPA. Mills can use turnings in large quantities if baled, but the allowance for baling now is not inducive. Dealers are anxious to obtain the same price as that set for heavy melting grades.

At Pittsburgh the defendants were the Allegheny-Ludlum Steel Corp., the Jones & Laughlin Steel Corp. and two scrap dealers, Stainman Bros. of Williamsport, Pa., and the Hodes Coal & Junk Co. of Lockhaven, Pa. A third junk firm, M. Glosser & Sons of Johnstown, has accepted a consent decree.

The government accused the firms of upgrading scrap in violation of the price control act.

Frank B. Ingersoll, attorney for Allegheny-Ludlum, contended the price control act provides for issuance of an injunction only when there is more than one violation. The government alleged the company accepted one car of upgraded scrap.

Schwartz Heads BEW Section Which Will Import Scrap

Jersey City, N. J.

• • • Benjamin Schwartz of New York and Jersey City has been appointed chief of the scrap metals section of the Bureau of Economic Warfare. At one time he was director general of the Institute of Scrap Iron & Steel Inc., and vice president of Schiavone Bonomo Corp.

The BEW will seek to organize and develop new sources of supply of scrap metals in foreign countries and will arrange for their shipment to the United States.

Frieder Accepts Position With Metals Reserve Corp.

Cleveland

• • • Philip W. Frieder, of Philip W. Frieder Co., has resigned as vice-president of the Scrap Iron & Steel Institute, following his acceptance of the position of technical consultant on scrap to the Metals Reserve Corp. Directors of the Scrap Institute elected Edward B. Michaels, of the Hyman-Michaels Co., Chicago, who was treasurer of the Institute prior to his election to the new position. Hiram Winteritz, president of Charles Dreifus Co., Philadelphia, was elected treasurer to succeed Mr. Michaels.

Mine Hoist Stored Since 1920 Fired into Open Hearths

Chicago

• • • Showing how forgotten corners of industrial plants can be a major source of the scrap needed to make steel for war, a carload of junk with a story was unloaded last Saturday at the Indiana Harbor plants of Inland Steel Co.

The junk just a week ago was a mine hoist which had been stored since 1920 at Inland's Armour No. 1 mine on the Cuyuna range of Minnesota. From 1912 to 1920 the hoist hauled some 2,000,000 tons of iron ore to the surface at Crosby, Minn. Whenever the question of scrapping the two big drums came up, engineers would save it by declaring it might come in handy some day. Finally the engineers were talked into letting it go for junk.

Disputes Settled by Penalizing Dealers

Pittsburgh

• • • At least in one district the scrap bottleneck involving unusually high rejections with its attendant waste of time and effort in returning carloads to dealers for re-sorting, has been broken by arbitration involving the use of OPA inspectors.

Within the past few days rejected scrap cars here have been unloaded and where inferior grades have been found, the price of the scrap has been set at the ceiling price for such grades, even though the car originally was sold as a superior grade of scrap. For example a carload of scrap sold as No. 1 heavy melting but rejected because it contained a percentage of No. 2 bushelings has been taken in by the mill at the No. 2 busheling price. This will eliminate the necessity of reloading such scrap shipments and returning them to the shippers for re-sorting and reshipping.

This method of taking care of rejected carloads is expected to discourage the practice of some dealers in loading inferior material in cars supposed to contain superior material. The ultimate result is expected to speed up the transportation and consumption of available scrap with all parties living up to OPA regulations.

District Markets

PHILADELPHIA — Supply continues tight with most mills drawing on their limited inventories. No furnaces have been taken off as a result of the growing shortage.

CLEVELAND — Scrap interests here are watching with concern the possibility that a 5 per cent tax upon freight rates may be imposed in the new tax bill. With prices frozen and labor costs increasing, this would only be an additional handicap. There has been no important change in the scrap movement here, although the Warren district has shown some improvement for the first time in many months.

PITTSBURGH — Collections are no better here this week with increasing anxiety among scrap consumers concerning shortages this fall. Many companies here have about exhausted what little backlog they had.

CHICAGO — For the time being, the scrap supply situation is a little easier here. No furnaces are reported down this week due to lack of scrap. Despite this

momentary improvement, the movement of scrap is still insufficient to permit acquisition of stocks for winter months. Action is expected shortly on the question of the price of baled steel turnings. It is generally expected that the price will be the same as heavy melting to compensate for the cost of baling. The volume of turnings coming on to the market is increasing rapidly but lack of a decision on proper price of baled material is slowing its movement.

NEW YORK — Major consumers are reported being taken care of adequately here. Meanwhile, the barge movement to western New York State continues.

BUFFALO — Only automobile scrap receipts have tapered off here in the last few weeks. Other scrap iron and steel still is coming in excess of current consumption. Removal of 52 miles of street car rails from city streets has been assured through an agreement reached between the city council and federal officials. The job is expected to net close to 10,000 tons of top grade scrap.

BOSTON — Some report the movement has slowed up; others that it has increased. Opinion is based on what kind of material is handled. Collectively, the New England movement is quite satisfactory. The new Government sponsored scrap drive will not, it is generally believed, bring material results here for the reason there has been no letup since the first drive started. There is a steady gain in production of steel turnings, especially in Rhode Island, as silversmiths and other industries shift to war work.

TORONTO — While there was no large decline in offerings and supply continues in excess of actual consumption, the heavy drain on accumulations in the rural districts is noted within a hundred miles of Toronto. Offerings from these districts are beginning to fall off, but supplies from more distant areas are making up the difference.

BIRMINGHAM — Large tonnages continue to be shipped from this district to northern points. Cast iron grades, which have been exceptionally tight here, have eased.

CINCINNATI — The movement of old materials is slowing up and dealers generally report that the available material is just about equal to present consumption. Little hope is held for building any kind of a reasonable inventory against the winter season.

ST. LOUIS — A total of 11,451 tons of scrap moved out of Missouri automobile "graveyards," during June, 4000 tons less than in May, partly due to the fact that many yards were flooded when rivers in this area overflowed. Floods also have held down other shipments so far this month. The high rate of operation continues, although at least two mills are drawing on their reserves. Fears are expressed by dealers that the mills will feel the shortage keenly by fall.

SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES		Low Phos.		Heavy Structural and Plate			Cut Auto. Steel Scrap			1 ft. and Under and Auto. Springs, and Crank-shafts			Alloy free Low Phos. and Sulphur Turnings			Heavy Axle and Forge Turn. First Cut			Electric Furnace Bundles		
	(No. 1 Heavy Melting; No. 1 Hydr. Compresed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	Turnings; No. 2 Busheling; Cast Iron Borings	Billet, Bloom, Scrap Forge and Cast Crops Steel	Bar Crops, Punchings, Plate Scrap	Tube Scrap	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	\$20.00	\$16.00	\$16.00	\$25.00	\$22.50	\$23.00	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00	\$19.50	\$21.00	\$19.50	\$21.00	\$19.50	\$21.00	\$19.50	\$21.00	
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.75	19.75	20.25	20.75	18.75	19.25	19.75	16.75	16.75	16.75	16.75	16.75	16.75	16.75	16.75	16.75	16.75	16.75	16.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	22.25	20.25	20.75	21.25	19.25	19.75	20.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	21.25	19.25	19.75	20.25	18.25	18.75	19.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25	16.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	21.00	19.00	19.50	20.00	18.00	18.50	19.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.85	18.85	19.35	19.85	17.85	18.35	18.85	15.85	15.85	15.85	15.85	15.85	15.85	15.85	15.85	15.85	15.85	15.85	15.85
Toledo, Ohio.	17.50	13.50	13.50	22.50	20.00	20.50	18.50	19.00	19.50	17.50	18.00	18.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.50	18.50	19.00	19.50	17.50	18.00	18.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburgh, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	20.00	18.00	18.50	19.00	17.00	17.50	18.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.50	17.50	18.00	18.50	16.50	17.00	17.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.50	15.50	16.00	16.50	14.50	15.00	15.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles; No. 3 bundles are \$2 less than No. 1 heavy melting.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, Conshohocken, 36c.; Atlanta, Birmingham, Pittsburgh, Cal., 32c.; Middletown, 14c.; Sparrows Point, 11c.; Chicago, 84c.; Detroit, 33c.; *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established switching charge for transporting by common carrier. If no established trans-

portation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.65 per ton.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order).

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP: Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails		
				3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	16.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	\$18.00	\$19.00	\$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Comparison of Prices

(Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	July 14,	June 7,	June 16,	July 15,
	1942	1942	1942	1941
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	\$ 5.00	\$ 5.00	\$ 5.00	\$ 5.00
Manufacturing terne	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00

Wire and Wire Products:					
(Cents Per Lb.)					
Plain wire	2.60	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55	2.55

Rails:
(Dollars Per Gross Ton)

Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)					
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	
Sheet bars	34.00	34.00	34.00	34.00	
Slabs	34.00	34.00	34.00	34.00	
Forging billets	40.00	40.00	40.00	40.00	
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00	

Wire Rods and Skelp:
(Cents Per Lb.)

Pig Iron: (Per Gross Ton)	July 14, 1942	July 7, 1942	June 16, 1942	July 15, 1941
No. 2 fdy., Philadelphia	\$25.89	\$25.89	\$25.89	\$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

[†]The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

cago district is 60c. per ton.

Scrap:	(Per Gross Ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh.	20.00	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00	24.00
No. 1 cast, Chicago.	20.00	20.00	20.00	20.00	20.00

Coke, Connellsville:
(Per Net Ton at Oven)

Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$6.00	\$6.125
Foundry coke, prompt	\$6.875	\$6.875	\$6.875	\$6.875	\$6.875

Non-Ferrous Metals:					
(Cents per Lb. to Large Buyers)					
Copper, electro., Conn...	12.00	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	53.50	
Zinc, East St. Louis....	8.25	8.25	8.25	7.25	
Lead, St. Louis.....	6.35	6.35	6.35	5.70	
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50	

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 120 to 128 herein.

... Composite Prices

FINISHED STEEL

FINISHED STEEL		PIG IRON		SCRAP STEEL	
July 14, 1942	2.30467c. a Lb.	.....	\$23.61 a Gross Ton	.....	\$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	.....	\$23.61 a Gross Ton	.....	\$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	.....	\$23.61 a Gross Ton	.....	\$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	.....	\$23.61 a Gross Ton	.....	\$19.17 a Gross Ton

	HIGH		LOW
1942.....	2.30467c.,		2.30467c.,
1941.....	2.30467c.,		2.30467c.,
1940.....	2.30467c., Jan.	2	2.24107c., Apr. 16
1939.....	2.35367c., Jan.	3	2.26689c., May 16
1938.....	2.58414c., Jan.	4	2.27207c., Oct. 18
1937.....	2.58414c., Mar.	9	2.32263c., Jan. 4
1936.....	2.32263c., Dec.	28	2.05200c., Mar. 10
1935.....	2.07642c., Oct.	1	2.06492c., Jan. 8
1934.....	2.15367c., Apr.	24	1.95757c., Jan. 2
1933.....	1.95578c., Oct.	3	1.75836c., May 2
1932.....	1.89196c., July	5	1.83901c., Mar. 1
1931.....	1.99629c., Jan.	13	1.86586c., Dec. 29
1930.....	2.25488c., Jan.	7	1.97319c., Dec. 9
1929.....	2.21778c., Mar.	22	2.21489c., Oct. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index re-circulated in Aug. 28, 1941 issue.

HIGH	LOW
\$23.61	\$23.61
\$23.61, Mar.	20
23.45, Dec.	23
22.61, Sept.	19
23.25, June	21
23.25, Mar.	9
19.74, Nov.	24
18.84, Nov.	5
17.90, May	1
16.90, Dec.	5
14.81, Jan.	5
15.90, Jan.	6
18.21, Jan.	7
10.51, Mar.	14

18.71 May 14 18.21, Dec. 17
Based on averages for basic iron
at Valley furnaces and foundry iron
at Chicago, Philadelphia, Buffalo,
Valley and Southern iron at Cincin-

SCRAP STEEL				
.....	\$19.17	a	Gross	Ton.....
.....	\$19.17	a	Gross	Ton.....
.....	\$19.17	a	Gross	Ton.....
.....	\$19.17	a	Gross	Ton.....

HIGH	LOW
\$19.17	\$19.17
\$22.00, Jan.	7
21.83, Dec.	30
22.50, Oct.	3
15.00, Nov.	22
21.92, Mar.	30
17.75, Dec.	21
13.42, Dec.	10
13.00, Mar.	13
12.25, Aug.	8
8.50, Jan.	12
11.33, Jan.	6
15.00, Feb.	18
17.50, Jan.	29

17.58, Jan. 29 14.08, Dec. 3
Based on No. 1 heavy melting
steel scrap quotations to consumers
at Pittsburgh, Philadelphia and Chi-
cago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	Pitts- burgh	Chi- cago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	10	DELIVERED TO			
															Detroit	New York	Phi- ladel- phia
SHEETS																	
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢			2.65¢	2.22¢	2.35¢	2.28¢	
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢			3.70¢	3.17¢	3.41¢	3.39¢	
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢			4.05¢		3.75¢	3.68¢	
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢			4.00¢	3.47¢	3.73¢	3.69¢	
Long ternes ²	3.80¢		3.80¢										4.55¢		4.18¢	4.14¢	
STRIP																	
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢			2.75¢	2.22¢	2.48¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)					2.92¢	3.18¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								2.58¢		
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)					3.07¢	3.33¢		
TIN PLATE																	
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						5.38¢	5.34¢	
BLACK PLATE																	
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢				13	4.05¢		3.39¢	
TERNES, M'FG.																	
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40								
BARS																	
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)	2.52¢	2.80¢	2.27¢	2.51¢	2.49¢			
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.80¢	14					
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.52¢	2.55¢	2.27¢	2.40¢				
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢	2.27¢		2.49¢			
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢		
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)					2.82¢				
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢				
PLATES																	
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ⁽¹¹⁾	2.47¢	2.65¢	2.33¢	2.30¢	2.155¢			
Wrought iron	3.80¢																
Floor plates	3.35¢	3.35¢								3.72¢	4.00¢			3.73¢	3.69¢		
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)					3.97¢	4.15¢			3.71¢	3.60¢		
SHAPES																	
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)		2.47¢	2.75¢			2.28¢	2.22¢		
SPRING STEEL, C-R																	
0.26 to 0.50 Carbon	2.80¢				2.80¢			(Worcester = 3.00¢)									
0.51 to 0.75 Carbon	4.30¢				4.30¢			(Worcester = 4.50¢)									
0.76 to 1.00 Carbon	6.15¢				6.15¢			(Worcester = 6.35¢)									
1.01 to 1.25 Carbon	8.35¢				8.35¢			(Worcester = 8.55¢)									
WIRE⁹																	
Bright ¹⁵	2.60¢	2.60¢			2.60¢	2.60¢		(Worcester = 2.70¢)				3.10¢			2.94¢		
Galvanized																	
Spring (High Carbon)	3.20¢	3.20¢			3.20¢				(Worcester = 3.30¢)				3.70¢		3.54¢		
PILING																	
Steel sheet	2.40¢	2.40¢					2.40¢						2.95¢		2.74¢		
IRON BARS¹³																	
Wrought single refined	4.40¢																
Wrought double refined	5.40¢																

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Ship plates only. ¹² Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. ¹³ Boxed. ¹⁴ Portland and Seattle price, San Francisco price is 2.50c. ¹⁵ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

WITH PHILCO XL BATTERIES IN YOUR TRUCKS

**EVERY CHARGE LASTS
10% LONGER!**



**10% GREATER CAPACITY...SUSTAINED
HIGH VOLTAGE...LONGER LIFE!**

Powered with Philco XL Storage Batteries, your Industrial Trucks can be worked 10% longer between charges! Philco oversize grids and Philco engineering developments give you a battery with 10% greater capacity!

Only in a Philco do you get flint-hard, "K" Process plates for high capacity and sustained voltage . . .

Philco Triple Insulation for long productive life . . . rugged Philco construction for minimum maintenance costs. These technical advances have grown out of Philco's fifty years of practical battery experience.

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**PHILCO
STORAGE
BATTERIES**



PHILCO'S NEW
TRENTON, N. J.,
PLANT HAS
TRIPLED PRO-
DUCTION FACIL-
TIES OF PHILCO
STORAGE BATTERIES

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.25 higher; f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling	\$34.00
Forging quality	40.00

Shell Steel

Per Gross Ton

3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.	
Prices delivered Detroit are \$2.25 higher.	

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer	\$34.00
-------------------------	---------

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared	1.90c.
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Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in.	0.15c. a lb. higher.
Quantity extras apply.	

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton

\$54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per Lb.

High speed	.67c.
Straight molybdenum	.54c.
Tungsten-molybdenum	.57 1/2c.
High-carbon-chromium	.43c.
Oil hardening	.24c.
Special carbon	.22c.
Extra carbon	.18c.
Regular carbon	.14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Forgeable	Low Phosphorus	Charcoal
Boston†	\$25.53	\$25.03	\$26.53	\$26.03	.....	.....
Brooklyn	27.65	.....	.....	28.15	.....	.....
Jersey City	26.62	26.12	27.62	27.12	.....	.....
Philadelphia	25.89	25.39	26.89	26.39	.....	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedenland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	24.50	24.50	26.00	25.50	\$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	24.00	23.50	25.00	24.50	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.00	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	24.68	24.68	25.18	.....	.....	.....
Canton, Ohio	25.47	24.97	25.97	25.47	.....	.....
Mansfield, Ohio	26.06	25.56	26.56	26.06	.....	.....
St. Louis	24.50	24.00	.....	.....	.....	\$31.34
Chicago	24.00	23.50	24.50	24.00	.....	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	24.50	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	\$28.00	.....
Lyles, Tenn. fc.†	26.76	.....	27.26	26.76	33.00	.....
Duluth	24.50	25.00	24.50	.....	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	27.25	.....	.....	.....	.....	.....
San Francisco	27.25	.....	.....	.....	.....	.....
Seattle	27.25	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	27.50	27.50	28.00	.....	.....	.....
Toronto	25.50	25.50	26.00	.....	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

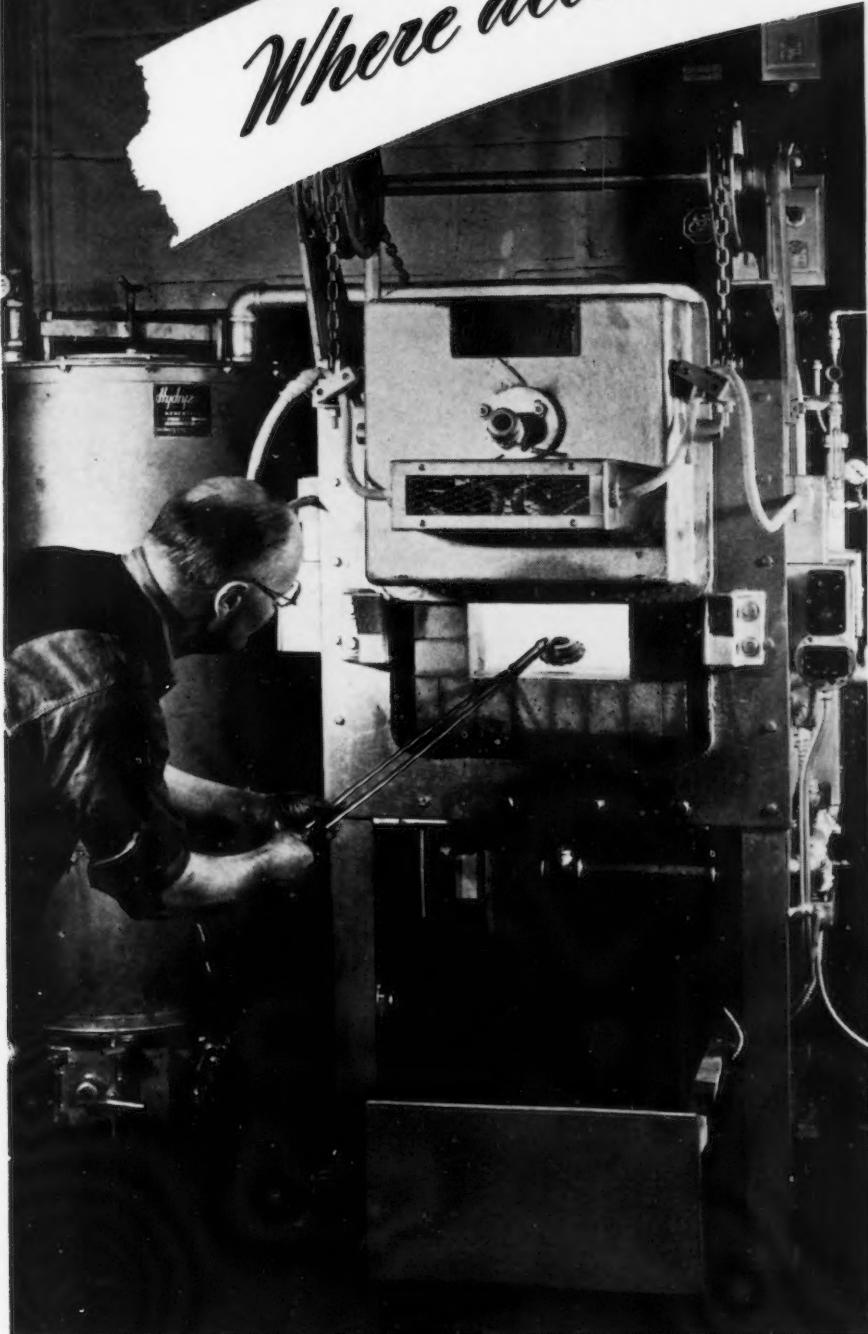
Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT									Basic Open-Hearth		Electric Furnace		
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs	
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35	.....	.10/.20	.....	.40/.60	.45c	\$ 9.00	.95c	\$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35	.....	.25/.35	.....	.85	17.00	1.35	27.00	.....
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35	.....	.10/.20	.....	.65	13.00	1.15	23.00	.....
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35	.....	.10/.20	.....	.65	13.00	1.15	23.00	.....
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35	.....	.20/.30	.....	.75	15.00	1.25	25.00	.....
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35	.....	.30/.40	.....	.90	18.00	1.40	28.00	.....
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.30/.40	.....	.90	18.00	1.40	28.00	.....
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.40/.60	.....	1.25	25.00	1.75	35.00	.....
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.2575	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.2575	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.3080	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.3080	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.3080	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.3080	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.4							

Where accurate **HEAT CONTROL** is essential



... Armstrong's Lightweight
Refractories help you to
meet specifications

THE quality of finished work as well as the costs and speed of production often depend on how accurately processing temperatures are controlled. That's why it's vitally important for precision heat-treating equipment to be insulated with *dependable* refractories.

Armstrong's Insulating Fire Brick have *proved* their dependability by more than 27 years of use in the high temperature field. You get close heat control with these brick because of their high insulating efficiency, their uniformity, and their accurate sizing—all qualities which help assure a heat-tight furnace.

There are five types of efficient Armstrong's Lightweight Refractories available for varied services at temperature maximums from 1600°F. to 2600°F. All are light in weight and have low heat storage, aiding quick heating and cooling. They rate high in physical strength, spalling resistance, and have ample refractoriness for the use intended. Armstrong's Brick are strong and arrive on the job in good condition. They lay up quickly and standard sizes can be easily cut, notched, and grooved with saw or rasp.

Why not get full facts now about Armstrong's high temperature line? Armstrong's engineers will be glad to help you choose the right brick, the right cement, and best method of application for your heat treating equipment. Write today to Armstrong Cork Company, Insulating Refractories Department, 978 Concord Street, Lancaster, Pa.



Lindberg Controlled Atmosphere Furnace used for heat treating small parts and tools. This precision work requires high temperatures accurately controlled. Efficient Armstrong's Refractories keep exact temperatures throughout the furnace. Many Lindberg furnaces of all types and in sizes from the one illustrated above to large car bottom units are insulated with Armstrong's Insulating Fire Brick for efficient operation and lasting dependable service.



ARMSTRONG'S INSULATING REFRactories

PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

Per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per

Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh.....	\$3.35	....	\$4.65	\$3.60	\$3.20	\$3.40	\$3.40	\$3.35	\$3.65	\$7.45	\$5.75	\$8.40	\$6.75
Chicago.....	3.25	4.10	4.85 ¹	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland.....	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia.....	3.55	4.05 ²	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.16
New York.....	3.58	4.60 ²	5.00	3.96 ³	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit.....	3.43	4.30	4.84 ¹	3.68*	3.40	3.80	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo.....	3.25	4.30 ¹	4.75 ⁴	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston.....	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham.....	3.45 ³	....	4.75 ¹	3.70 ³	....	3.55 ³	3.55 ³	3.50 ³	4.48	....	....	....	....
St. Louis.....	3.39	4.24 ²	4.99 ¹	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul.....	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee.....	3.38	4.23 ²	4.98 ¹	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore.....	3.50	....	5.05	4.00	....	3.70	3.70	3.85	4.04	....	....	....	....
Cincinnati.....	3.42	4.37 ²	4.42 ¹	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk.....	3.85	....	5.40	4.10	....	4.05	4.05	4.00	4.15	....	....	....	....
Washington.....	3.60	....	4.10	....	....	3.80	3.80	3.95	4.10	....	....	....	....
Indianapolis.....	3.45	4.25	5.01 ¹	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha.....	3.85	....	5.52 ¹	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Memphis.....	3.85	....	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans.....	4.05	....	4.30	....	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston.....	4.00	....	4.30	....	....	4.05	4.05	3.75	....	....	....	....	....
Los Angeles †.....	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco†.....	4.55	7.05	6.10	4.50	....	4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle.....	4.65 ⁷	....	5.70 ⁷	4.25	....	4.75	4.45	4.20	5.75	....	9.00	....	....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: ¹ 500 to 1499 lb., ² 400 to 1499 lb., ³ 400 to 3999 lb., ⁴ 450 to 1499 lb., ⁵ 1000 to 1999 lb., ⁶ 0 to 1999 lb., ⁷ 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb.; cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, \$3.43. †Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

HOW TO HELP YOUR PLANT IN THIS RUBBER CRISIS



THIS NEW 48-PAGE BOOKLET

is for managers, engineers and plant operating men. It shows how to conserve rubber through proper handling, installation and care by methods such as those illustrated below. Other subjects covered are molded goods, rubber covered rolls, rubber mountings, rubber printing materials, mats and matting, grinding wheels, electrical wires, cables and tapes. Free copies will be sent on request. Write the Mechanical Goods Division, Dept. 12, United States Rubber Company, at address below.



Protect Conveyor Belts by using "V"-shape notch in loading chute to distribute fine material first as cushion for heavy lumps.



Conserve Hose by proper choice and installation of couplings to assure application without injury to hose tube.



Extend Packing Life by examination of equipment, and reconditioning worn moving parts before repacking.



Preserve Rubber Linings from danger due to "changed over" operations, higher temperatures and possible damaging effects of substitute materials.

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue • Rockefeller Center • New York
In Canada: Dominion Rubber Co., Ltd., Toronto, Ont.

PRICES

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Lap	Seamless	Weld,	Cold	Hot	Hot	Drawn	Rolled	Rolled	\$	\$	\$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38									
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58									
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35									
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15									
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66									

(Extras for less carload quantities)

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft. 5%	
20,000 lb. or ft. to 29,999 lb. or ft. 10%	
10,000 lb. or ft. to 19,999 lb. or ft. 20%	
5,000 lb. or ft. to 9,999 lb. or ft. 30%	
2,000 lb. or ft. to 4,999 lb. or ft. 45%	
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton
6-in. and larger, del'd Chicago \$54.80
6-in. and larger, del'd New York 52.20
6-in. and larger, Birmingham 46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles 69.40
6-in. and larger f.o.b. cars, Seattle. 71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago. \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points) Per Gross Ton	
Light rails (from billets)	\$40.00
Light rails (from rail steel)	39.00
Base per Lb.	
Cut spikes	3.90c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to rail-roads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Welton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

ORES

Lake Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports)	Per Gross Ton
Old range, bessemer, 51.50	\$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35
Foreign Ores* (C.i.f. Philadelphia or Baltimore, Exclusive of Duty)	Per Unit
African, 46-48 Mn	70c.-75c.
Indian, 48-50 Mn	75c.

COKE*

Furnace	Per Net Ton
Connellsburg, prompt	\$6.00
Foundry	
Connellsburg, prompt	\$6.75 to \$7.00
*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive	

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) \$135.00

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon	\$113.00*
2.50 carbon	118.00*
2 carbon	123.00*
1 carbon	133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload \$2.00

Ferrotungsten, 100 lb. and less 2.25

Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90*

Ferrocolumbium, per lb. contained Cr, f.o.b. Niagara Falls, N. Y., ton lots \$2.25*

Ferrocobaltium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton \$142.50

Ferrocobaltium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton \$157.50

Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equaled with Rockdale, Tenn., gross ton. \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equaled with Nashville, gross ton \$75.00

Ferromolybdenum, per lb., Mo, f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.

Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

FLUORSPAR

Fire Clay Brick

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail \$25.00

Domestic, f.o.b. Ohio River landing barges 25.00

No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines 25.00

Foreign, 85% calcium fluoride, not over 5% Cl, c.i.f. Atlantic ports, duty paid Nominal

Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines \$34.00

As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis \$64.60

First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30

First quality, New Jersey 56.00

Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55

Second quality, New Jersey 51.00

No. 1, Ohio 43.00

Ground fire clay, net ton 7.60

Silica Brick

Per 1000

Pennsylvania \$51.30

Chicago District 58.90

Birmingham 51.30

Silica cement, net ton (Eastern) 9.00

Chrome Brick

Per Net Ton

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester \$54.00

Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester

Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester \$76.00

Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads) \$44.00

Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

FUEL OIL

No. 6 Bur. Stsd., del'd Chicago 4.75c.

No. 3 distillate del'd Cleveland 6.50c.

No. 4 indus., del'd Cleveland 6.00c.

No. 5 indus., del'd Cleveland 5.25c.

No. 6 indus., del'd Cleveland 5.55c.